

FIG. 2

FIG. 3a is a cross-sectional view of a device 200 in a first state. The device 200 includes a substrate 220 and a layer 222. A spring 224 is disposed within the layer 222. The spring 224 is in a compressed state, exerting a downward force on the layer 222. The layer 222 is in a deformed state, curving downwards. The device 200 is shown in a cross-sectional view, with the substrate 220 and layer 222 being hatched to indicate they are different materials. The spring 224 is shown as a coiled wire.

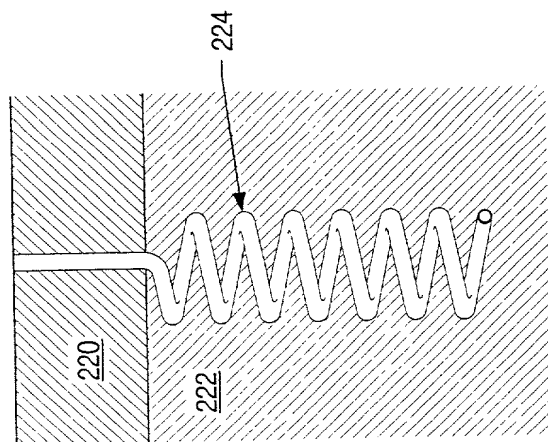


FIG. 3a

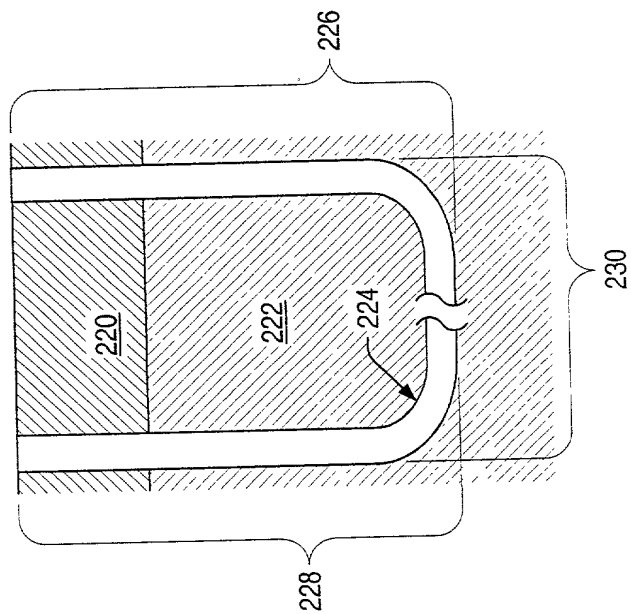


FIG. 3b

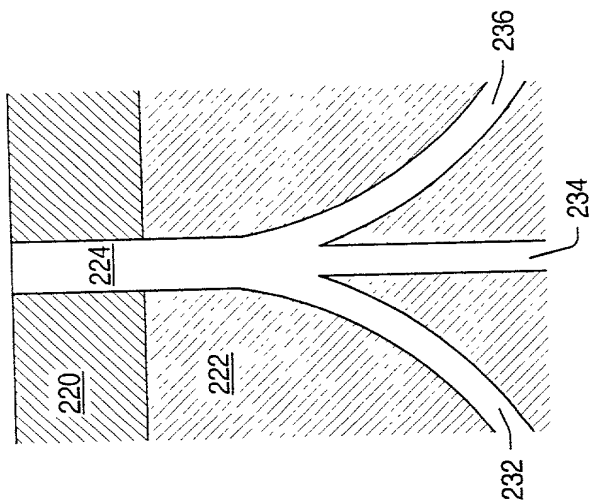


FIG. 3c

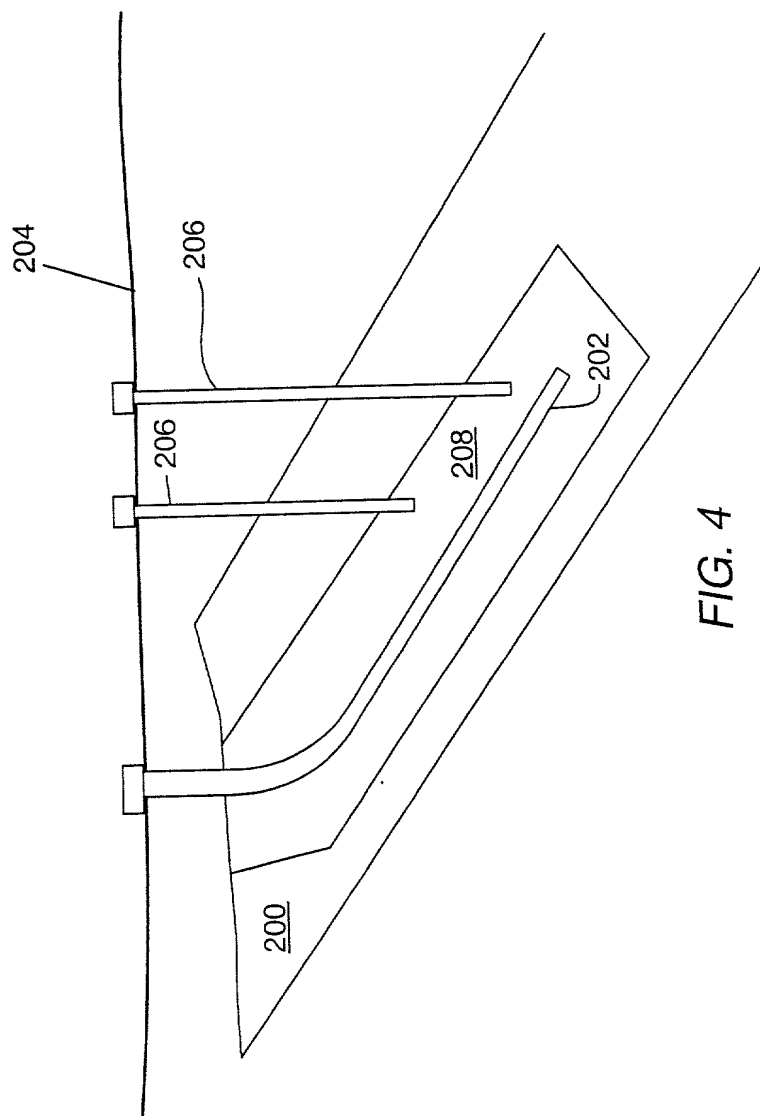
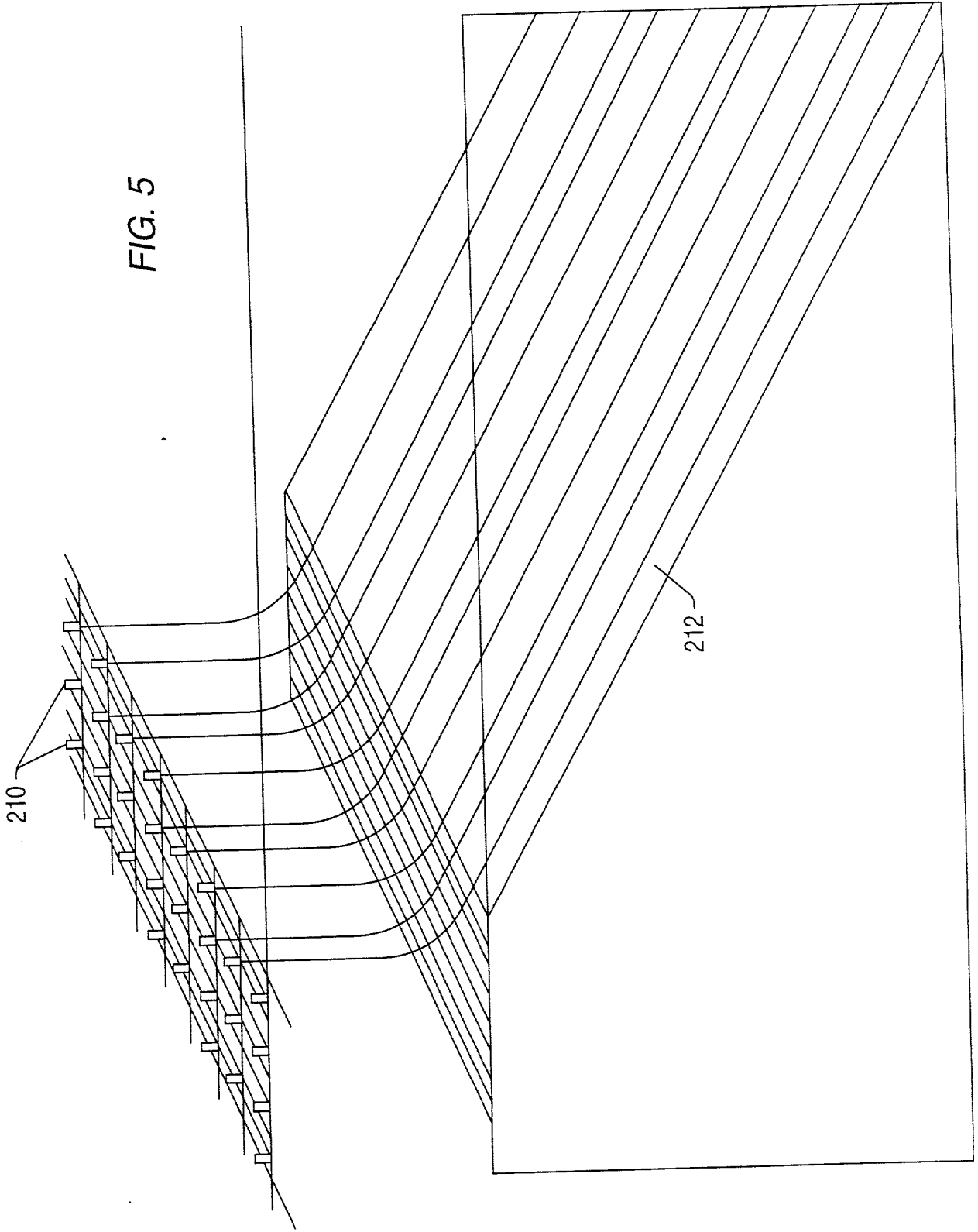


FIG. 4



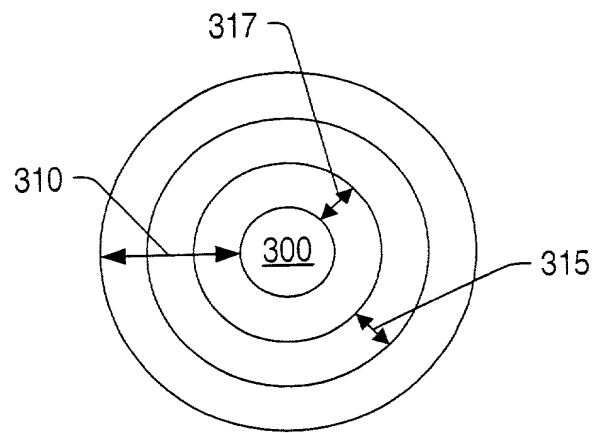


FIG. 6

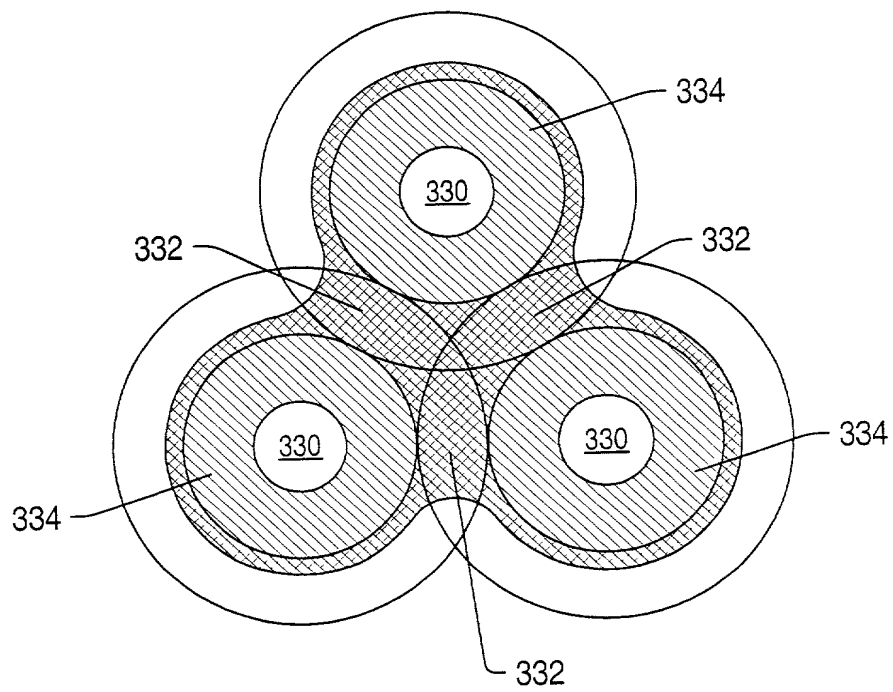


FIG. 7

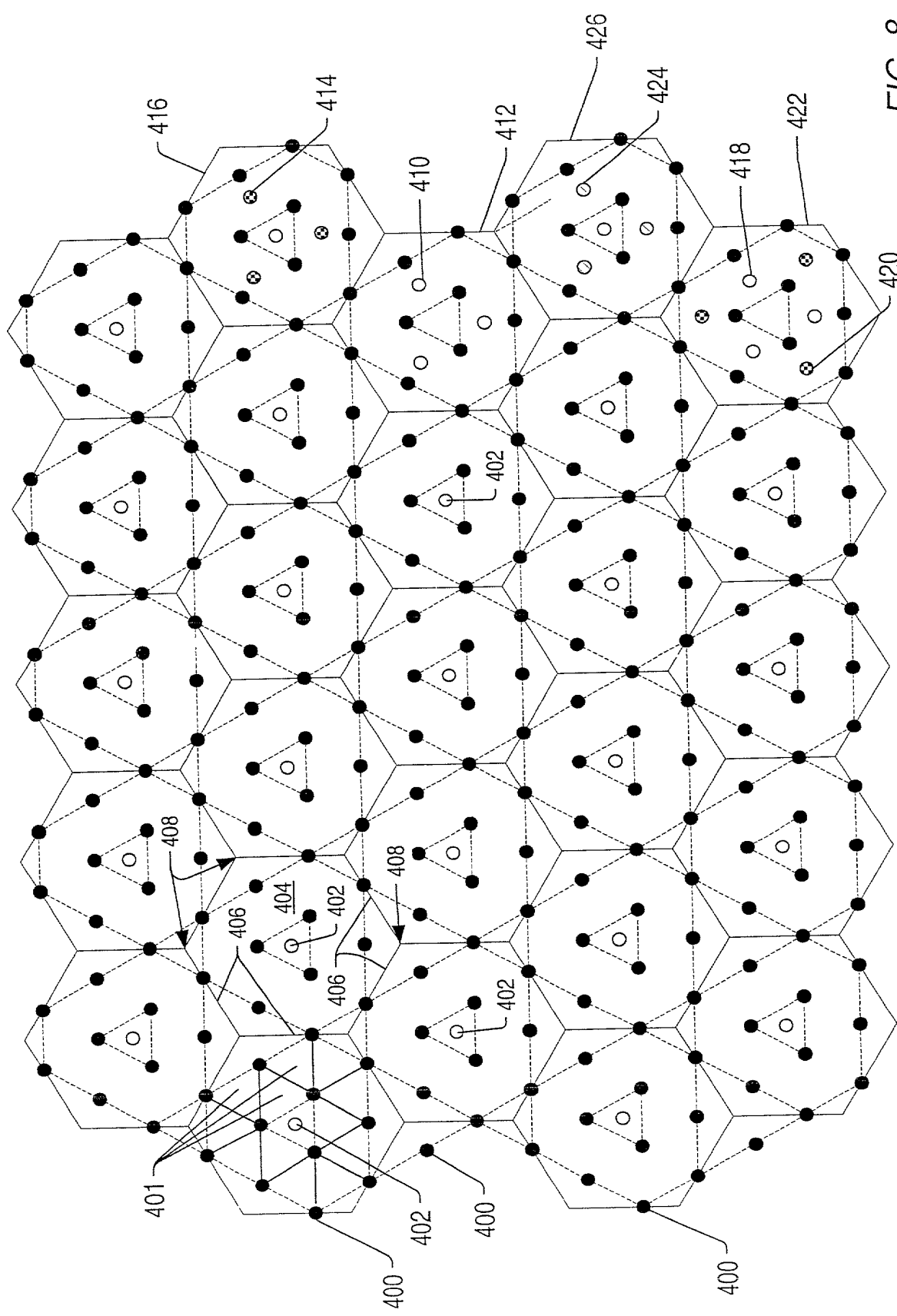


FIG. 8

FIG. 9 is a schematic diagram of a hexagonal lattice structure 400. The lattice is composed of a central hexagonal core 402, which is surrounded by a first shell of six vertices 400a and a second shell of six vertices 400b. The vertices 400a and 400b are connected to form a larger hexagonal structure 404. The central hexagonal core 402 is a regular hexagon. The first shell of vertices 400a is located at the midpoints of the edges of the central hexagon. The second shell of vertices 400b is located at the vertices of a larger hexagon that is concentric with the central hexagon. The vertices 400a and 400b are connected to form a larger hexagonal structure 404, which is a regular hexagon. The vertices 400a and 400b are also connected to the central hexagonal core 402.

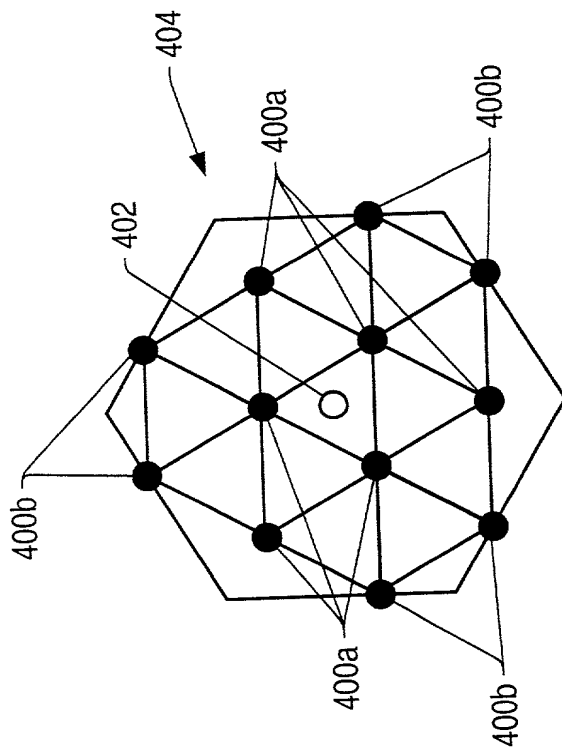


FIG. 9

FIG. 13 is a cross-sectional view of a device 500, showing a central vertical assembly 514 within a housing 516. The assembly 514 includes a top section 533, a middle section 535, and a bottom section 515. The housing 516 has a top flange 540 and a bottom flange 526. The top flange 540 is secured by a cap 550. The bottom flange 526 is secured by a base 518. The central assembly 514 is surrounded by a fluid medium 542. The top section 533 is connected to a line 543. The middle section 535 is connected to a line 541. The bottom section 515 is connected to a line 544. The housing 516 is made of a material 540. The central assembly 514 is made of a material 514. The fluid medium 542 is a liquid. The top flange 540 is a flange. The bottom flange 526 is a flange. The cap 550 is a cap. The base 518 is a base. The line 543 is a line. The line 541 is a line. The line 544 is a line. The material 540 is a material. The material 514 is a material. The liquid is a liquid.

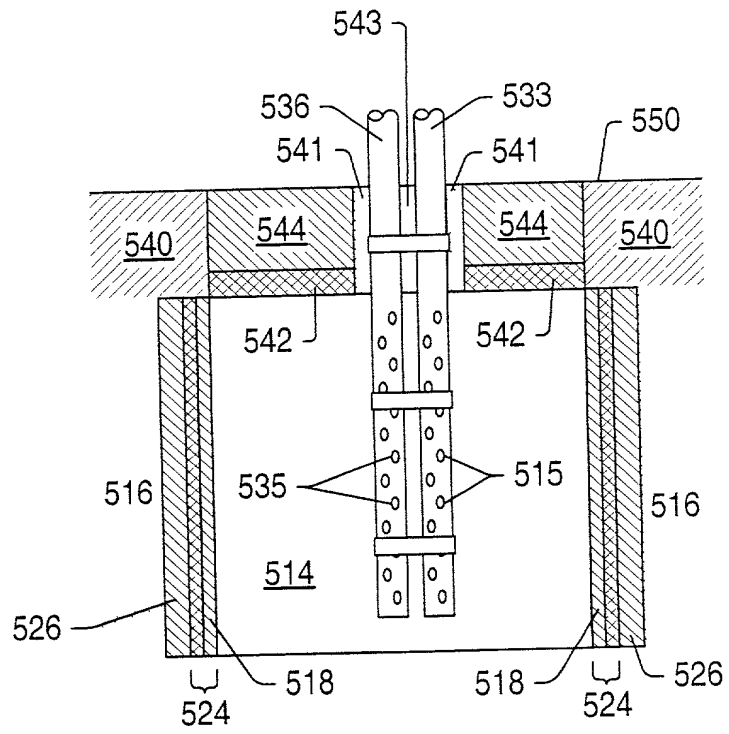


Fig. 13

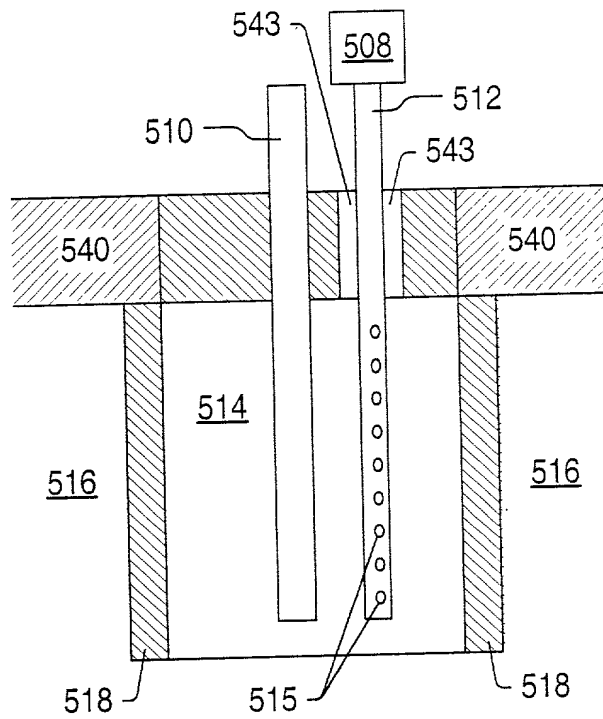


FIG. 14

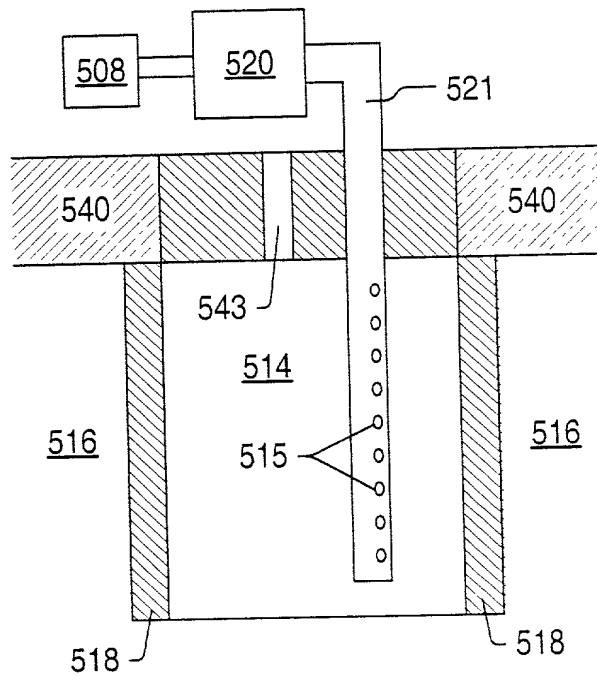


FIG. 15

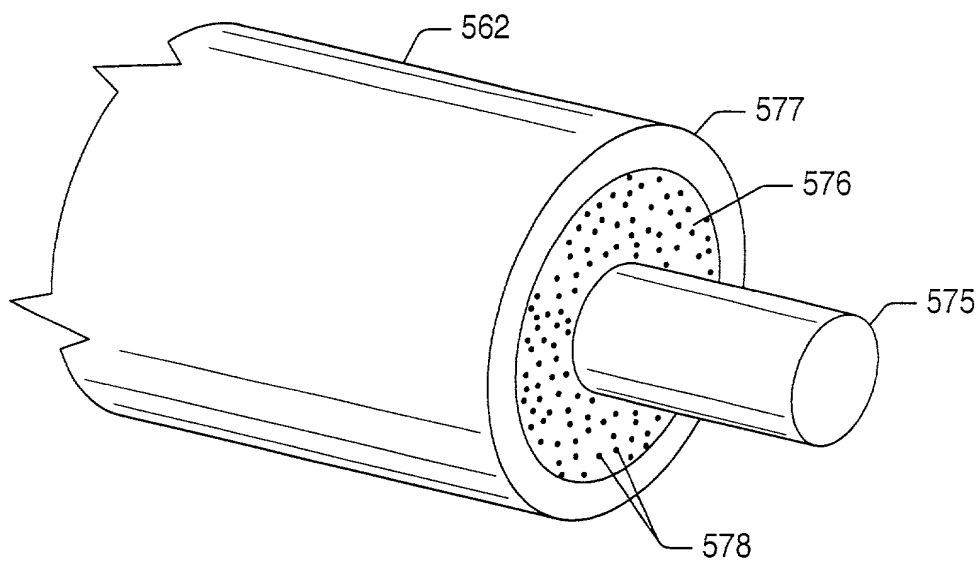


FIG. 16

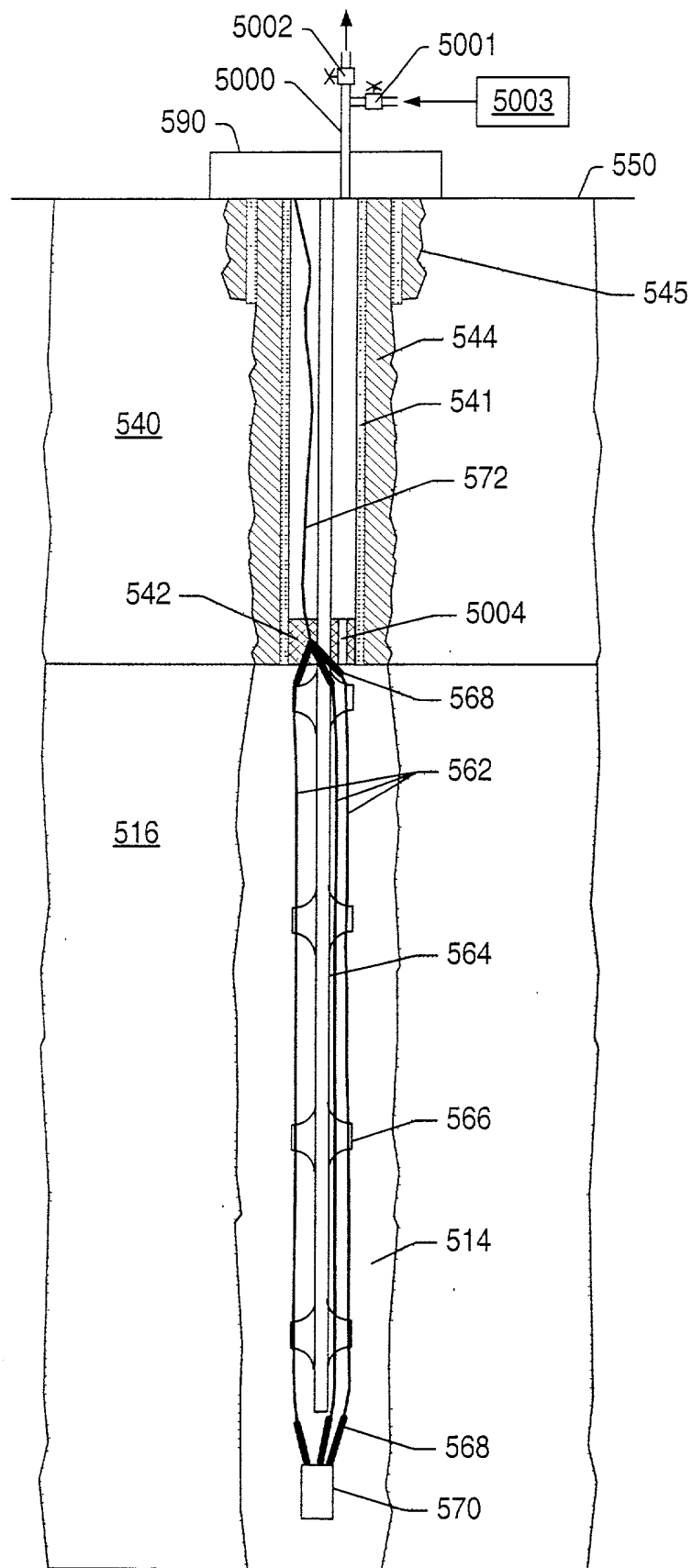


FIG. 17

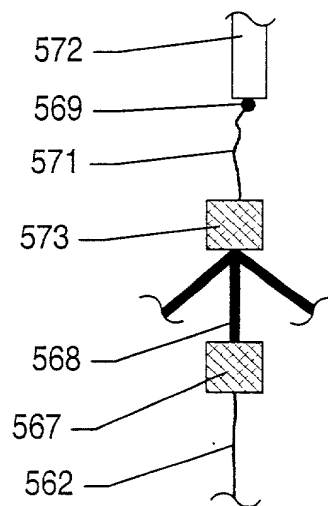


FIG. 17A

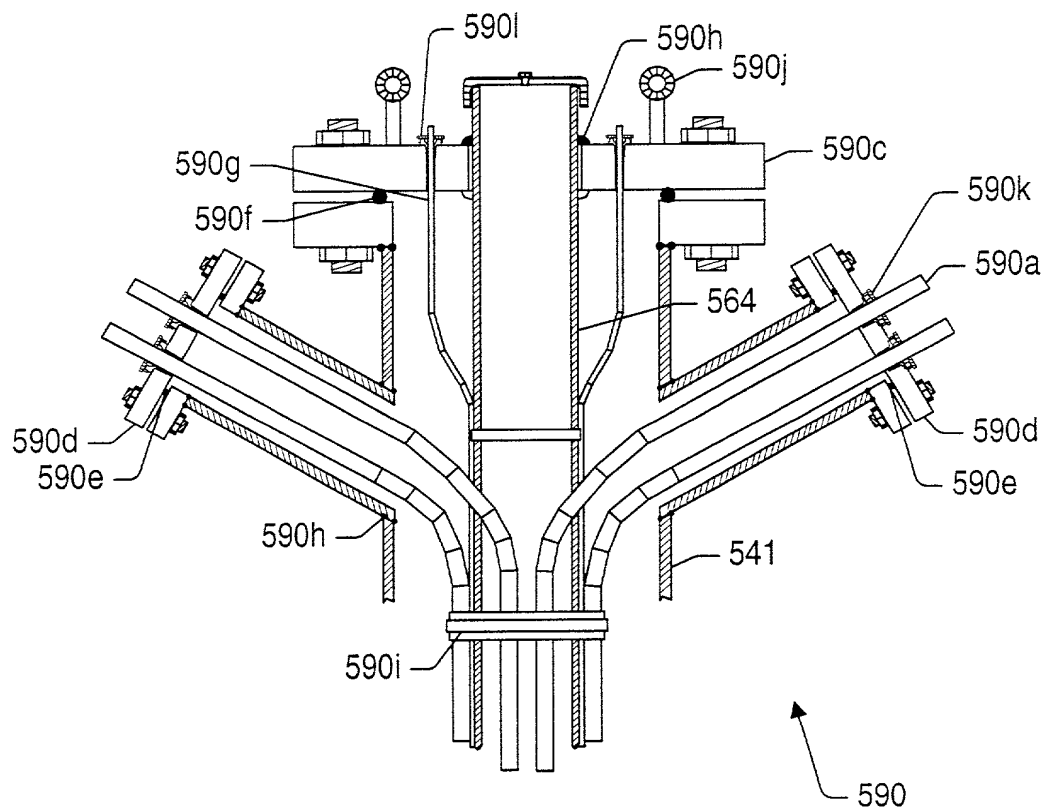


FIG. 18

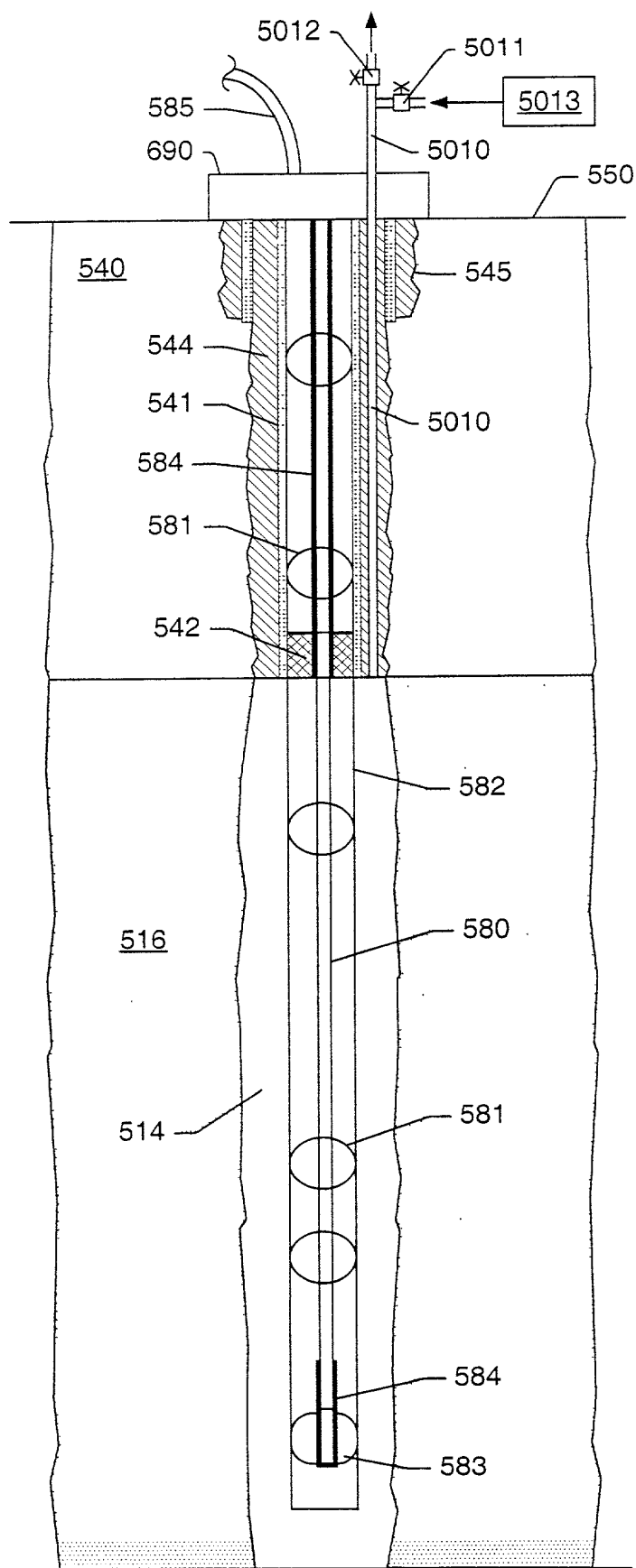


FIG. 19

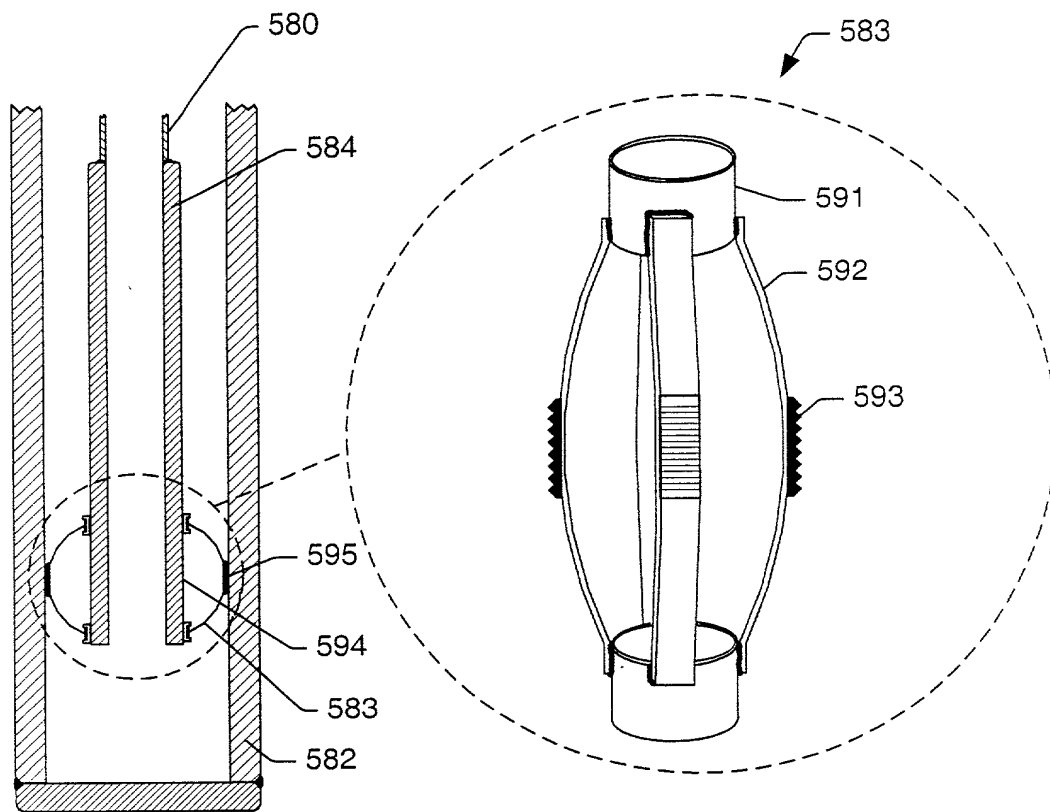


FIG. 20

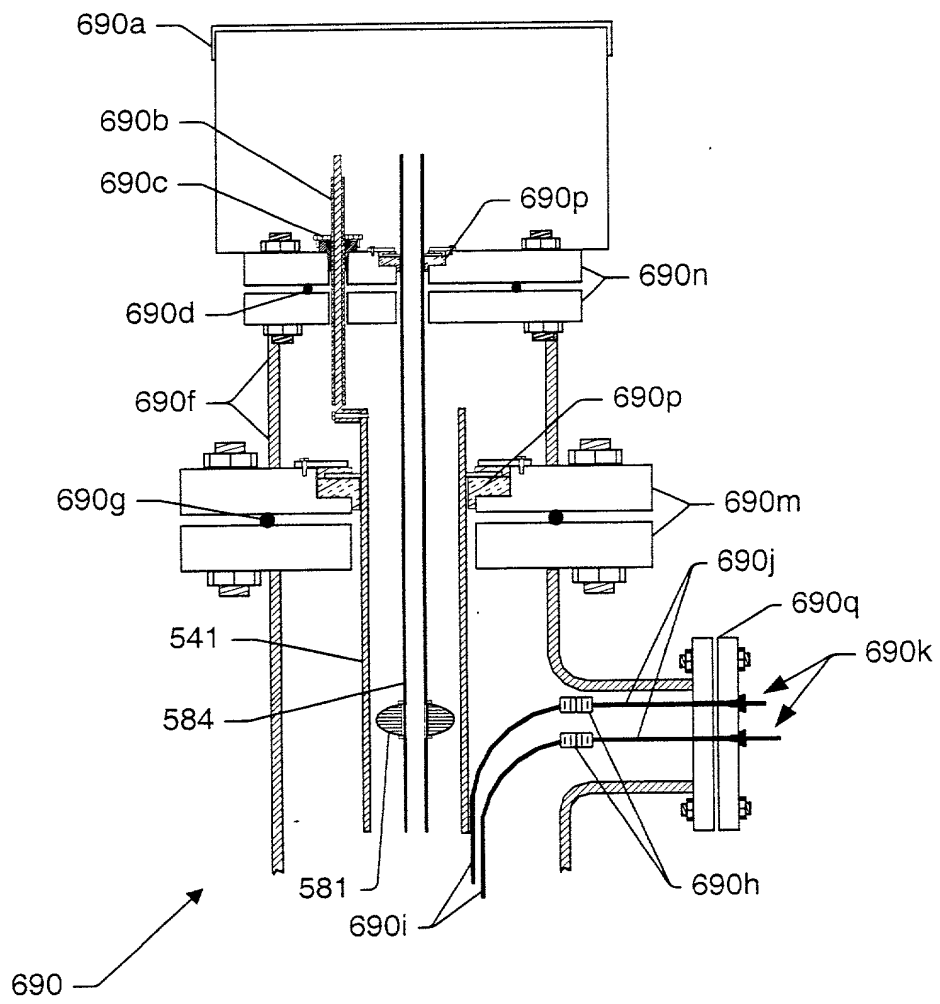


FIG. 21

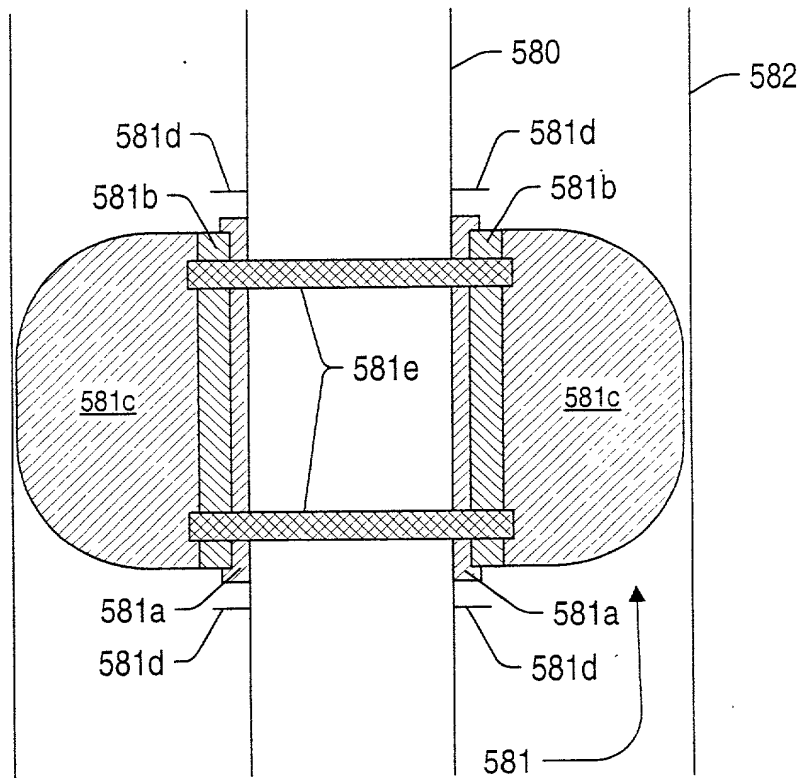


FIG. 22

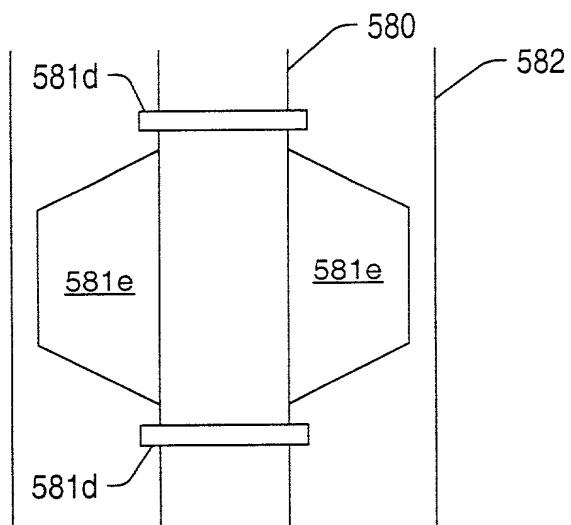


FIG. 23a

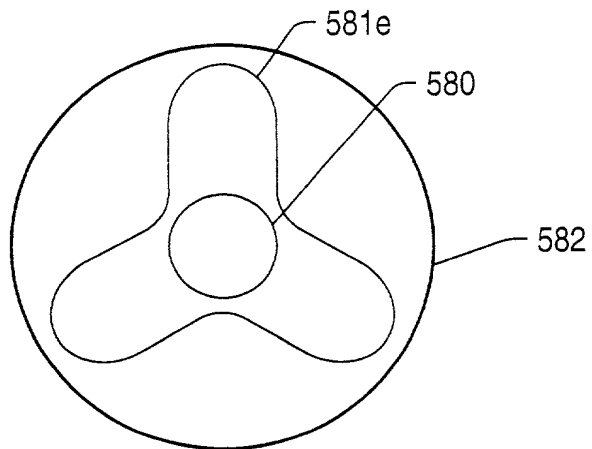


FIG. 23b

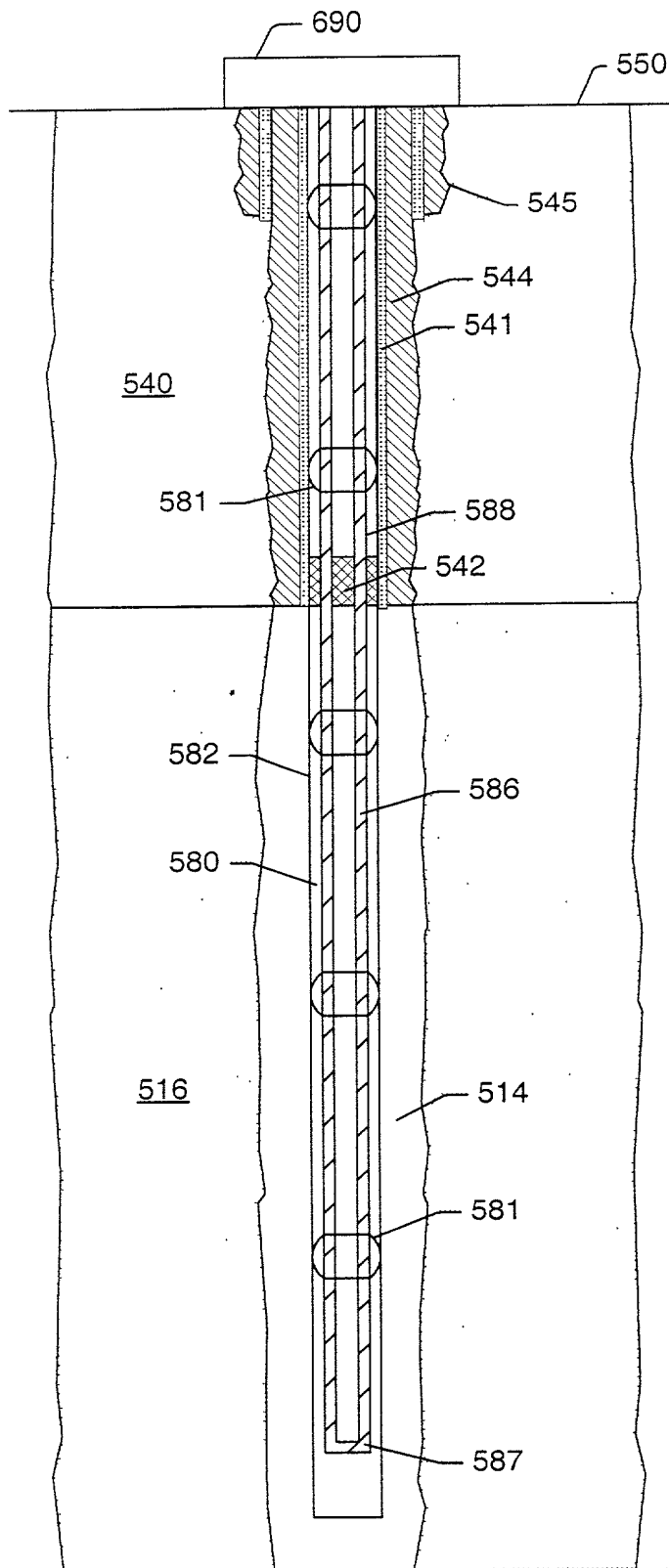


Fig. 24

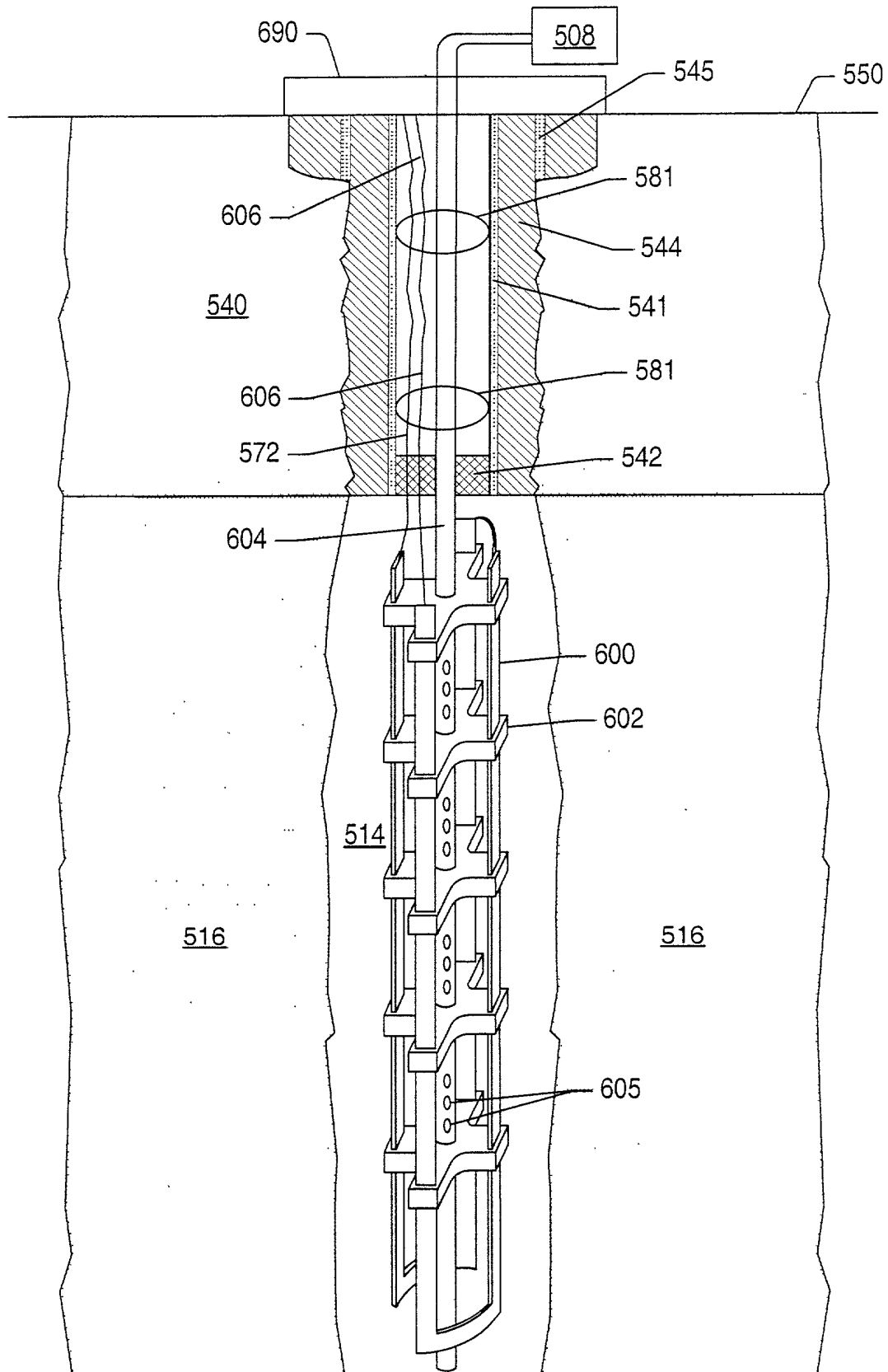


FIG. 25

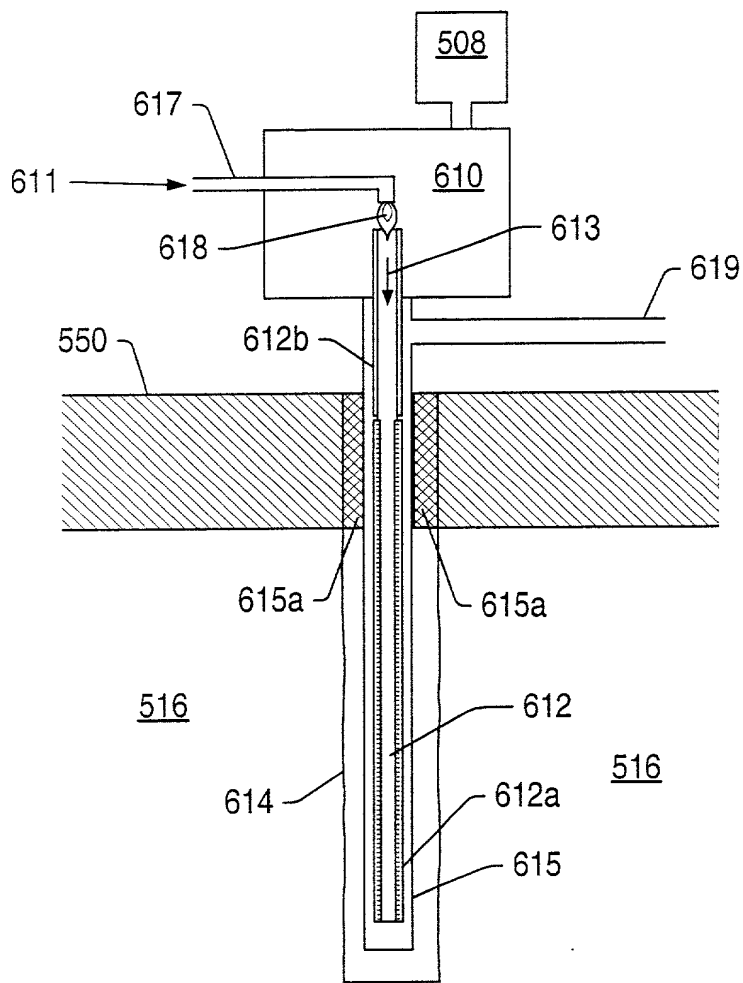


FIG. 26

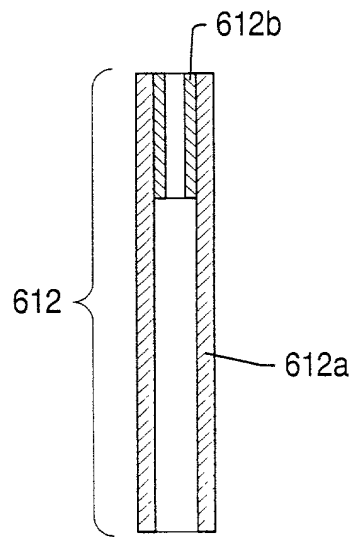


FIG. 27

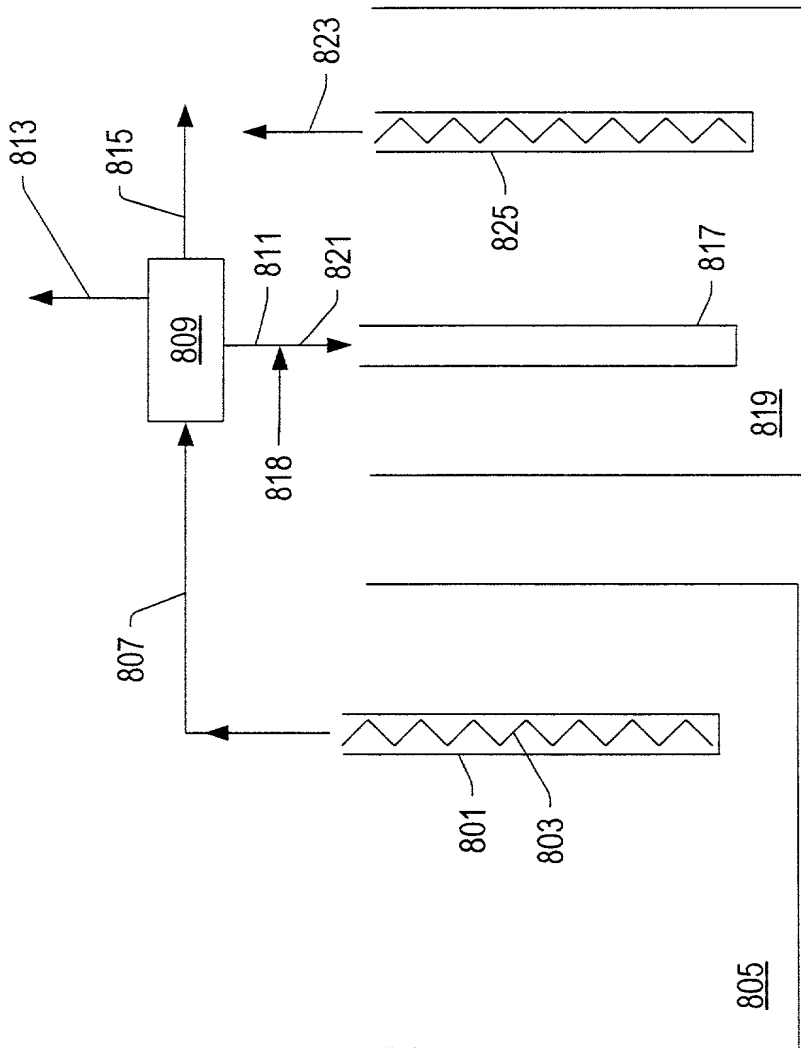


FIG. 29

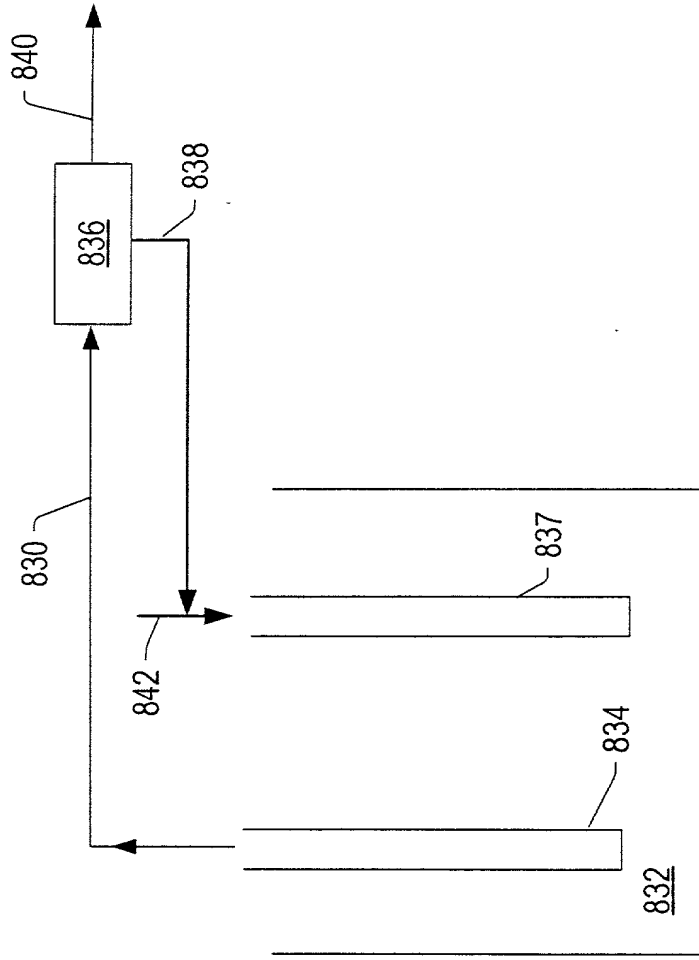


FIG. 30

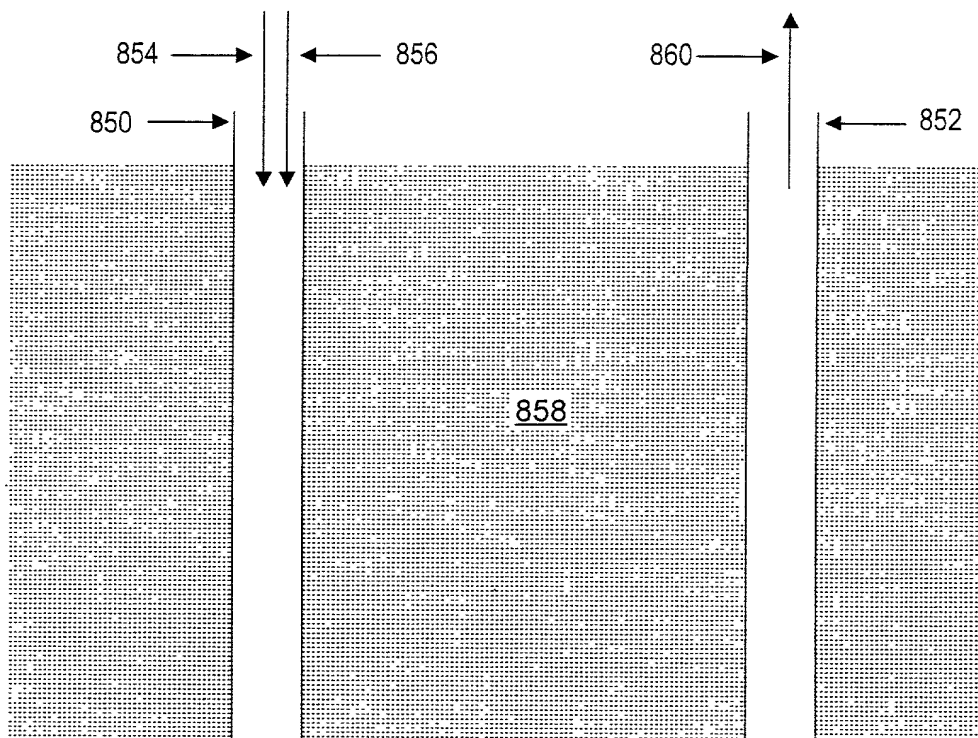


FIG. 31

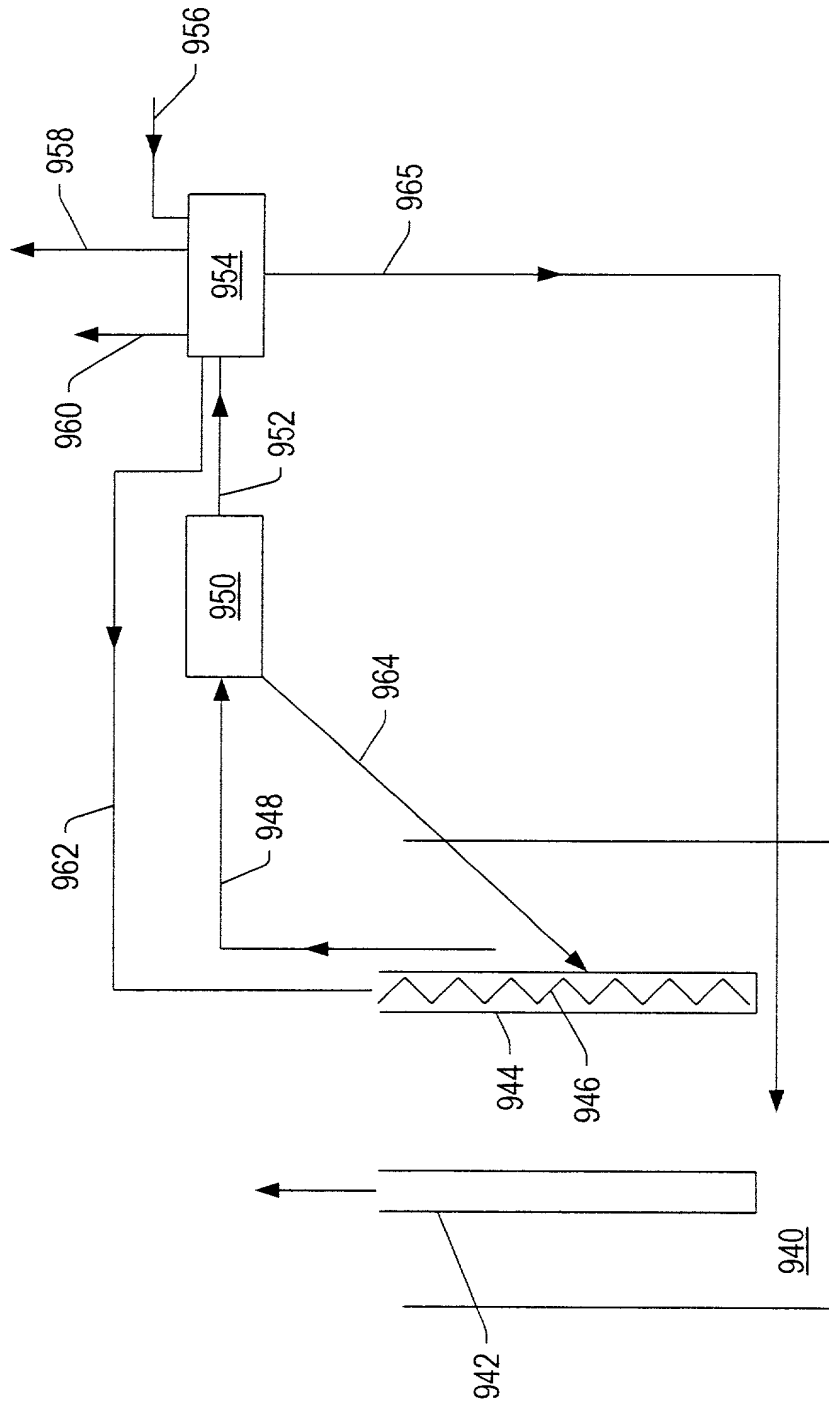


FIG. 34

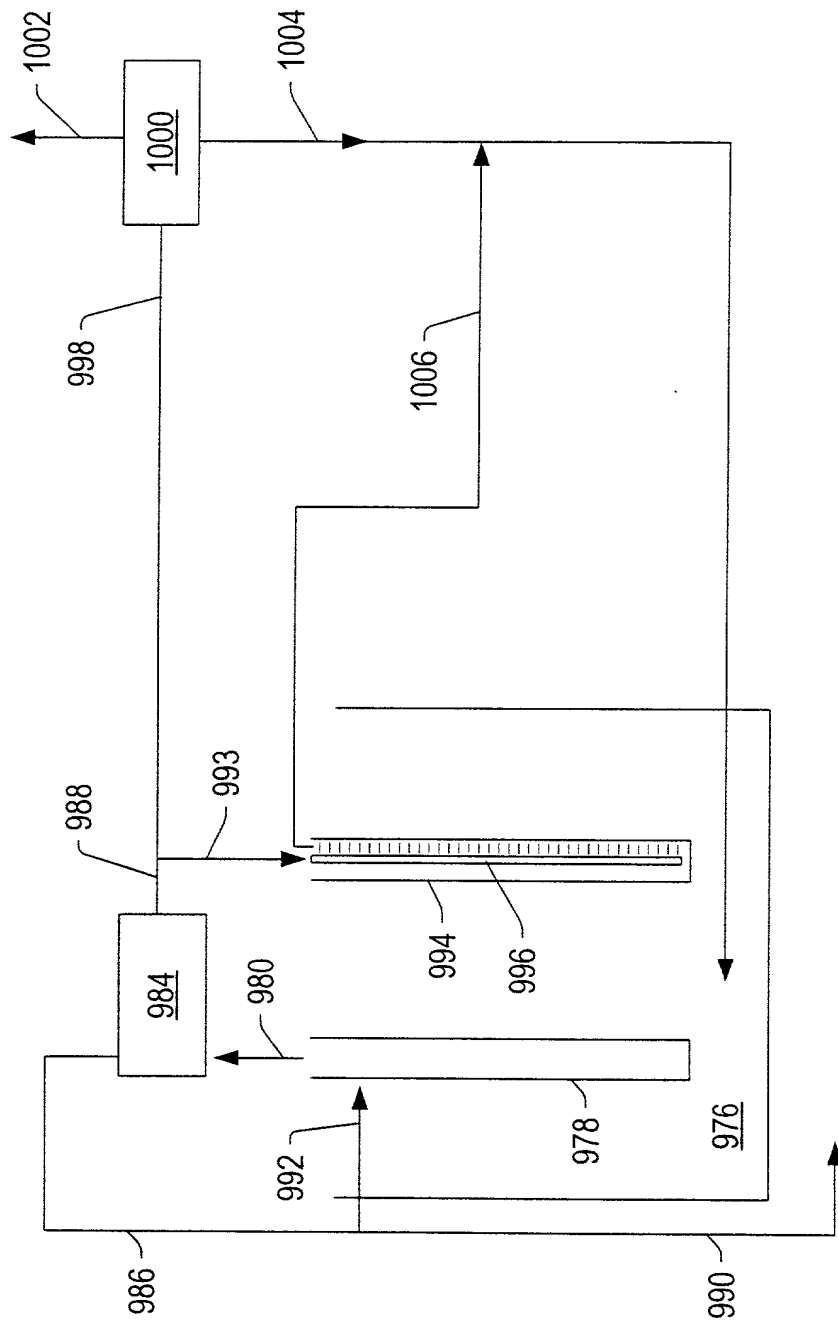


FIG. 35

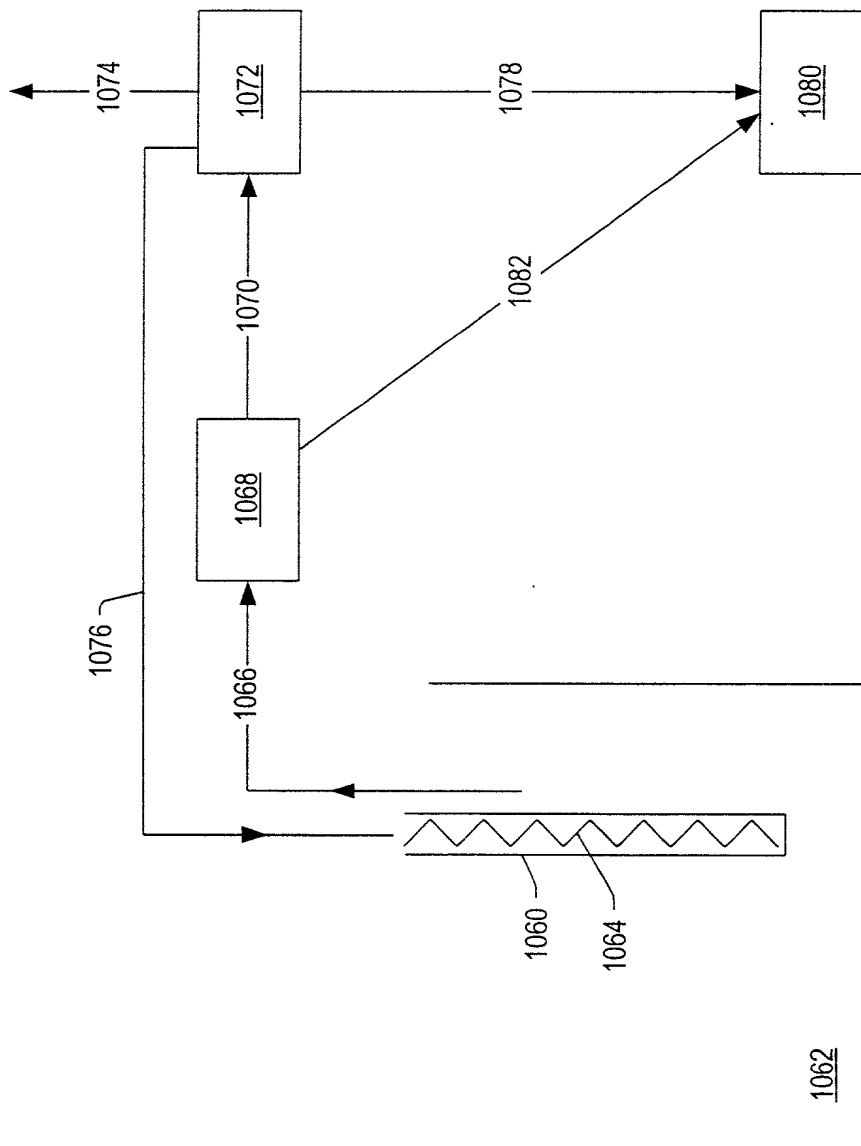


FIG. 37

FIG. 38 is a block diagram of a system 1000. The system 1000 includes a processor 1090, a memory 1092, a network interface 1094, and a user interface 1096. The processor 1090 is connected to the memory 1092, the network interface 1094, and the user interface 1096. The network interface 1094 is connected to a network 1100. The user interface 1096 is connected to a user 1102. The user 1102 is connected to a device 1106. The device 1106 is connected to a network 1108.

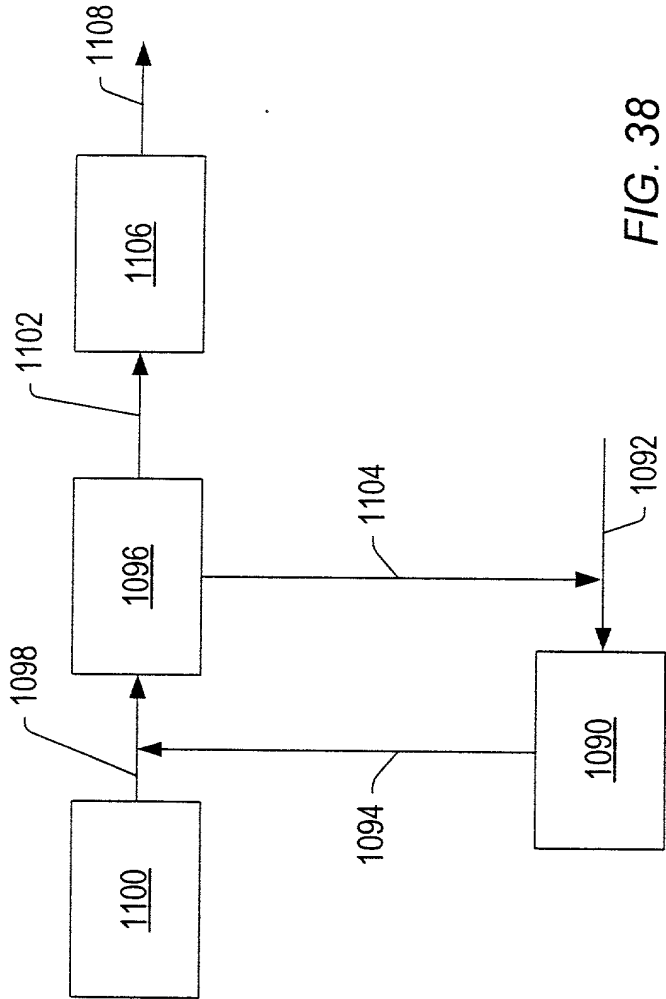


FIG. 38

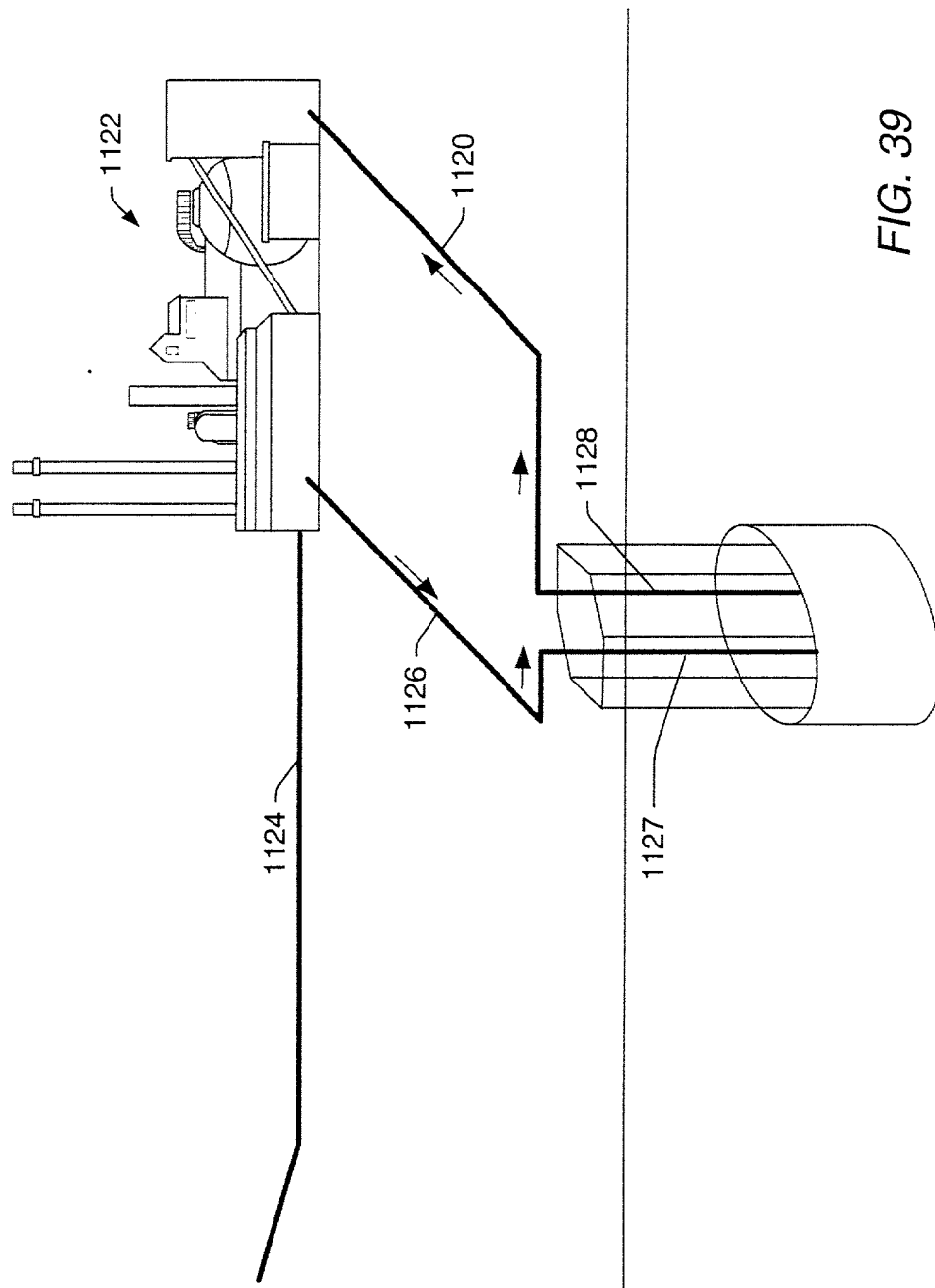


FIG. 39

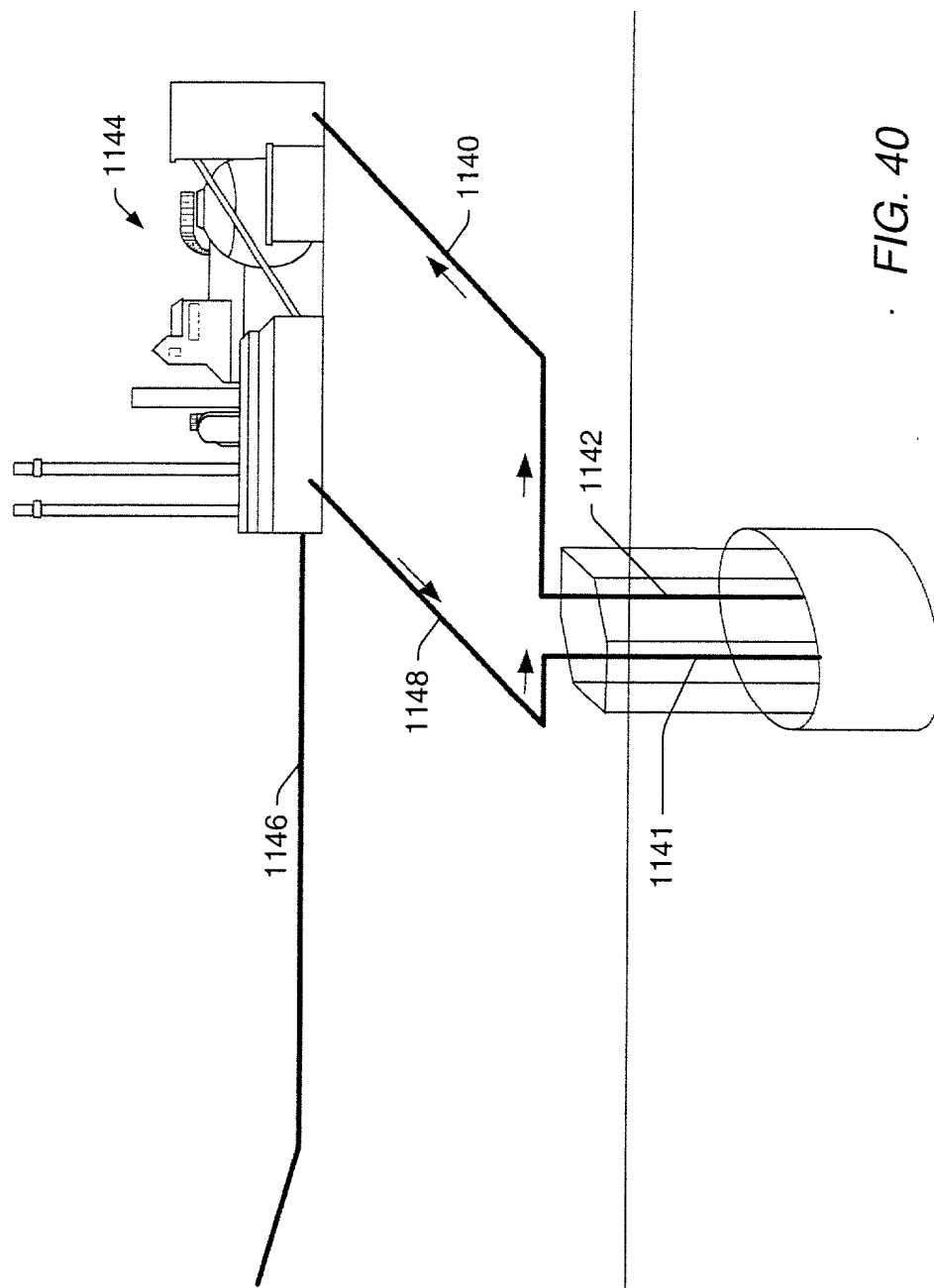


FIG. 40

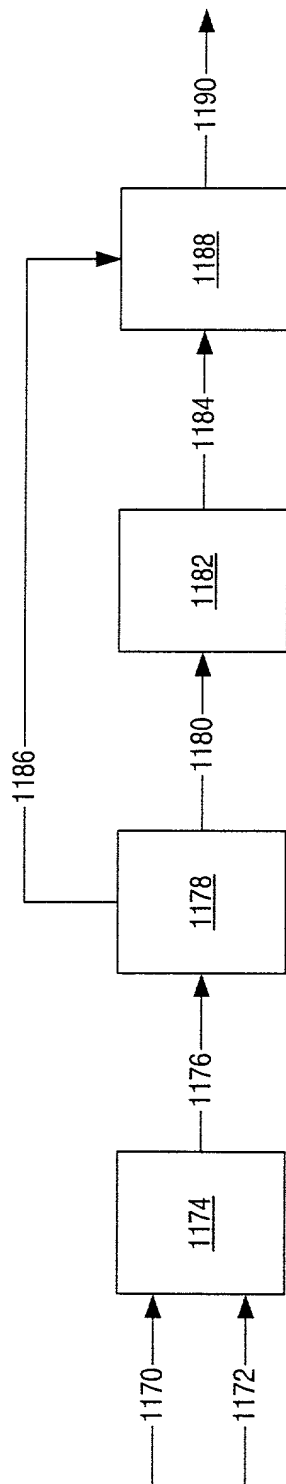


FIG. 41

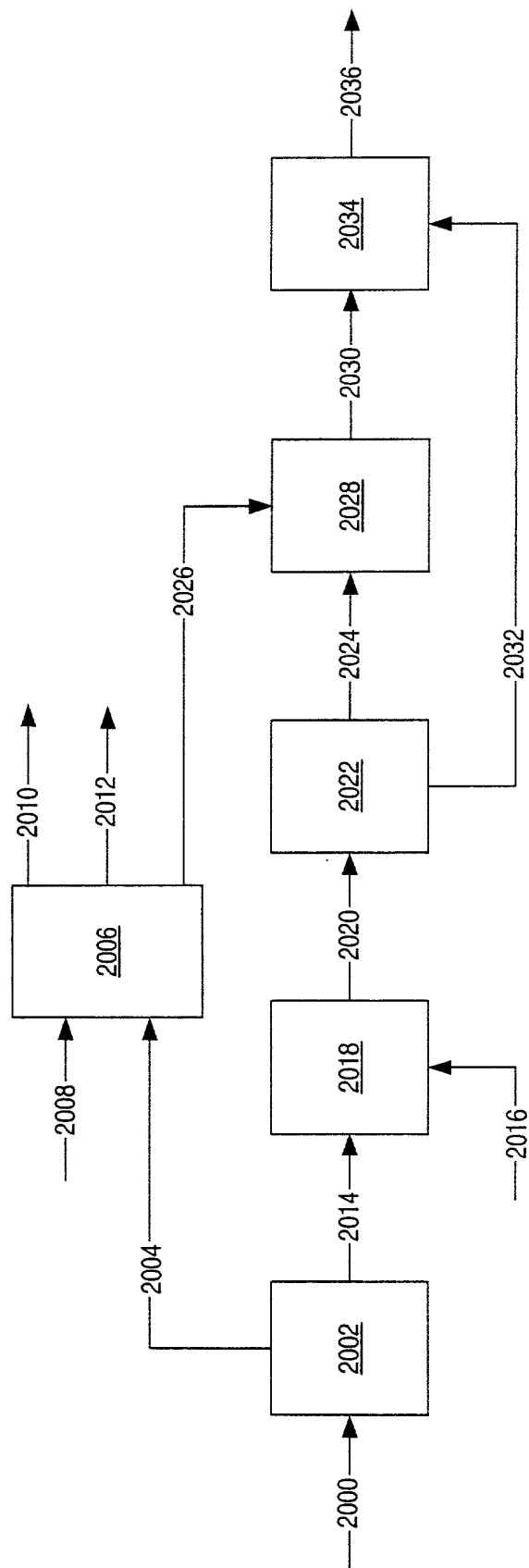


FIG. 42

FIG. 44 is a cross-sectional view of a device 2200 in a first state. The device 2200 includes a substrate 2204, a layer 2202, and a layer 2210. A fluid 2212 is introduced into a chamber 2214. The fluid 2212 flows through the chamber 2214 and exits through a channel 2216. The fluid 2212 is then collected in a reservoir 2218. The device 2200 is shown in a first state where the fluid 2212 is in the chamber 2214.

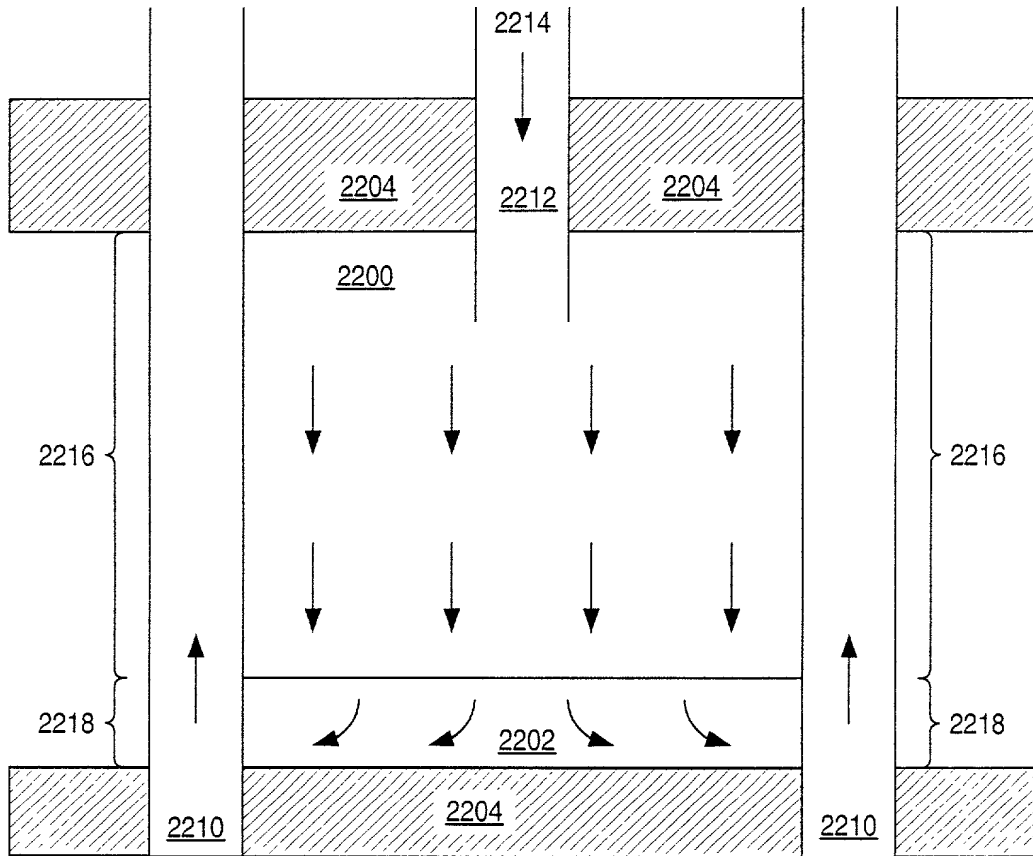


FIG. 44

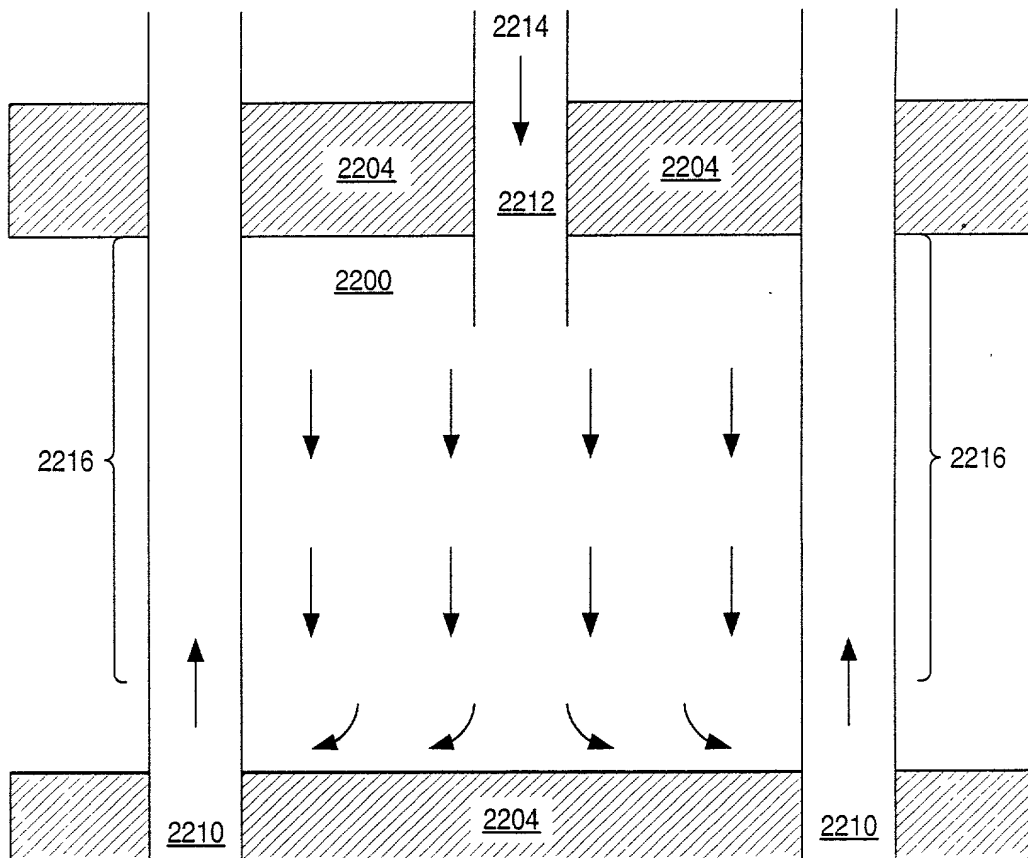


FIG. 45

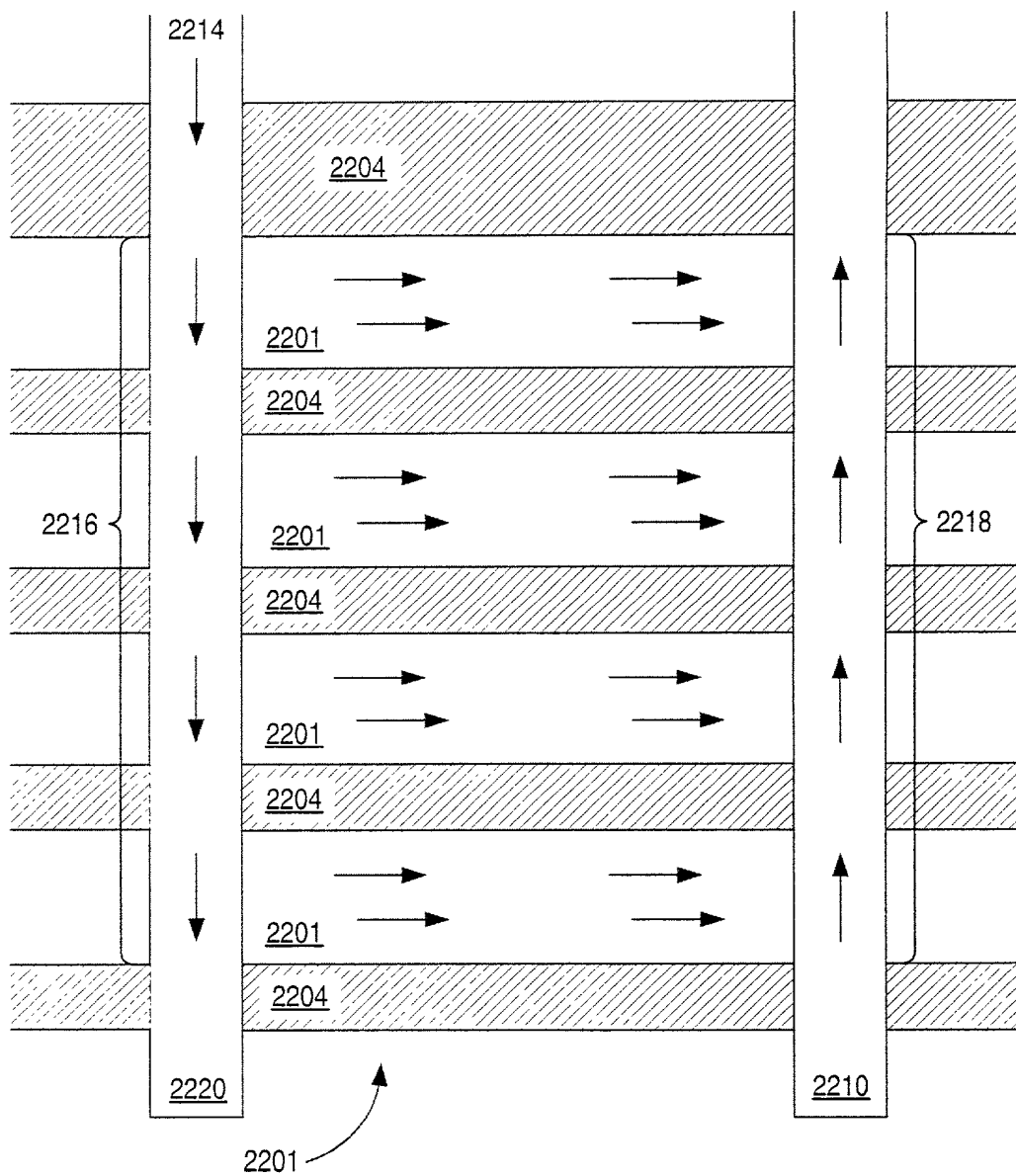


FIG. 46

FIG. 47 is a cross-sectional view of a device 200, showing a substrate 204 and a layer 2300.

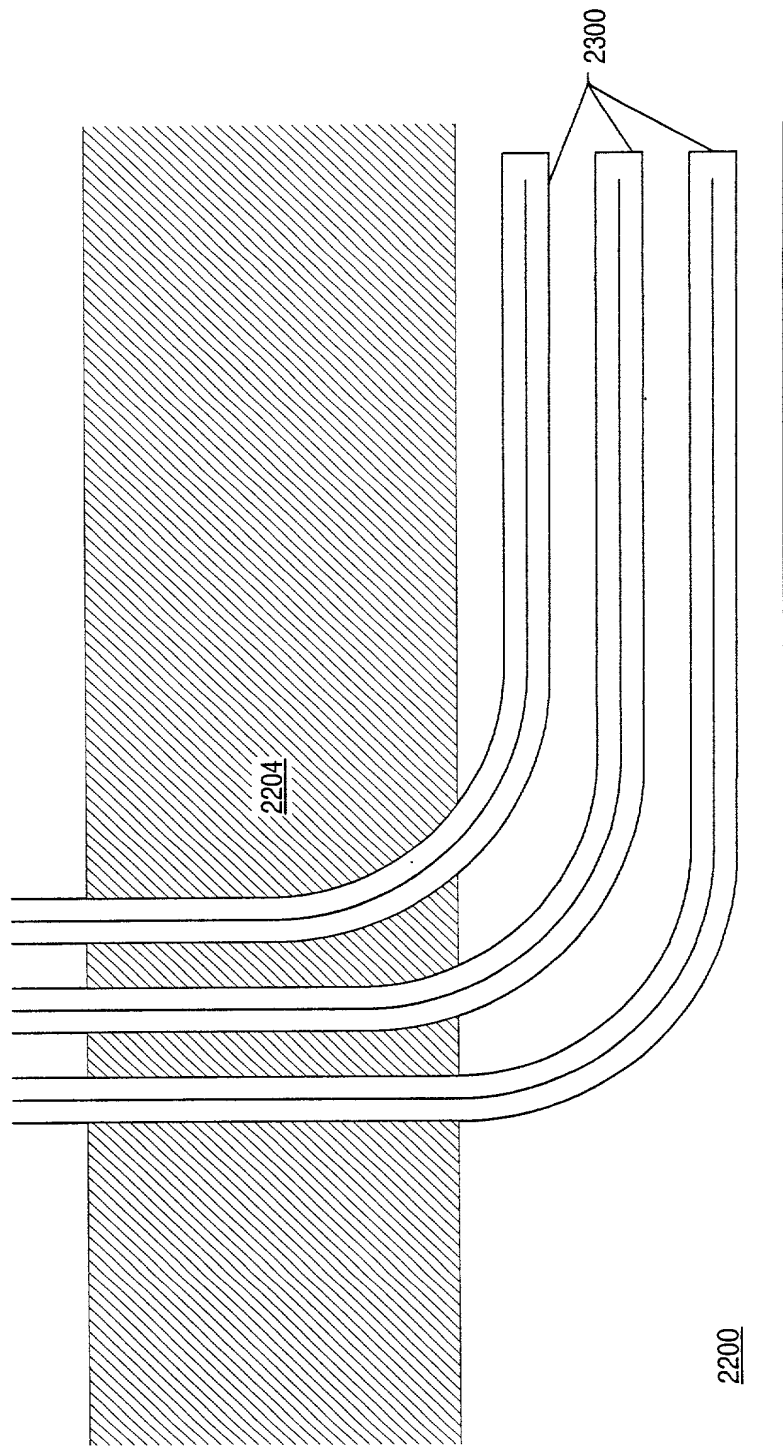


FIG. 47

FIG. 48 is a schematic diagram of a system for detecting a fault in a power system. The system includes a power system 2200, a fault detector 2300, and a fault indicator 2302. The fault detector 2300 is connected to the power system 2200 and is configured to detect a fault in the power system. The fault indicator 2302 is connected to the fault detector 2300 and is configured to indicate a fault in the power system.

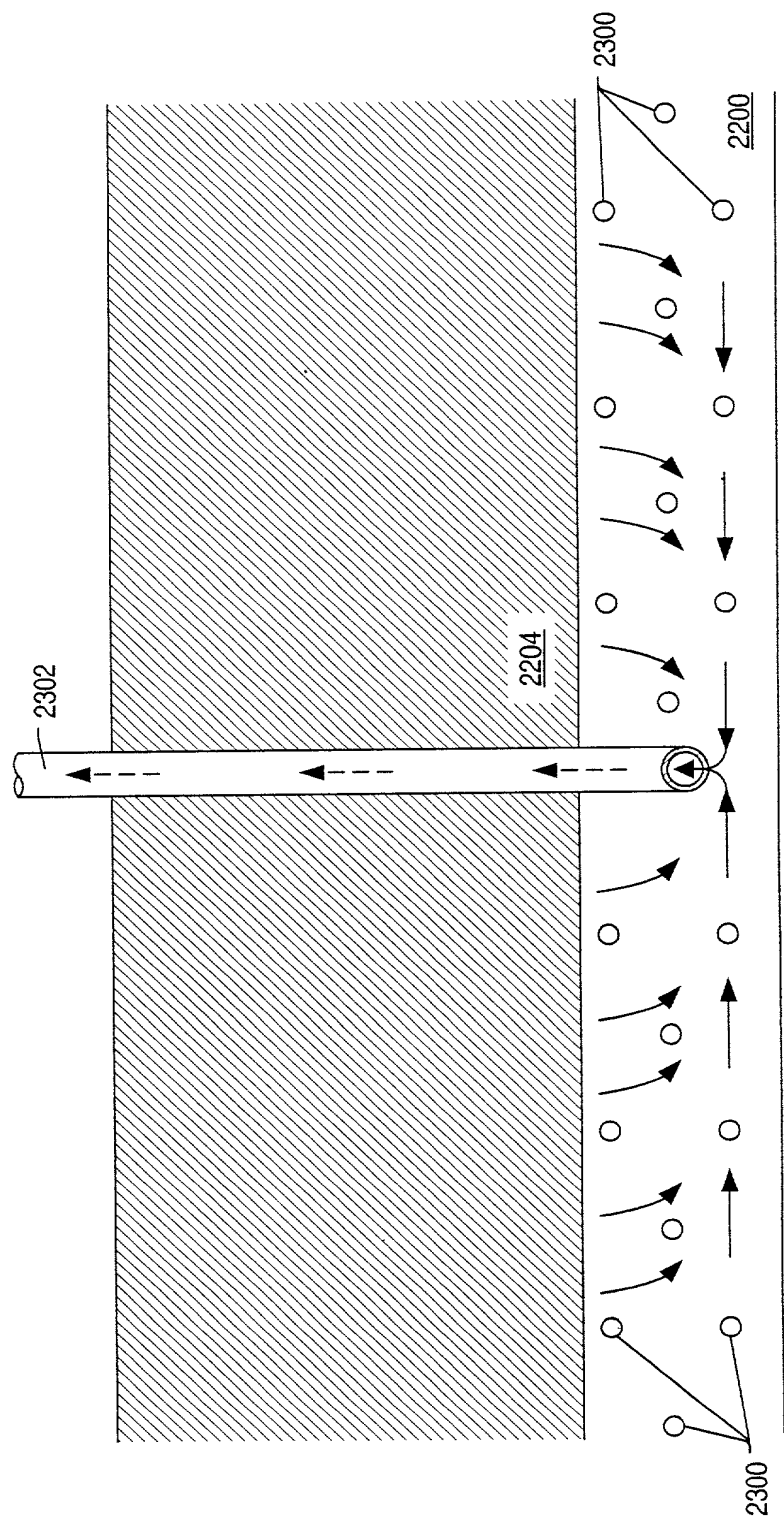


FIG. 48

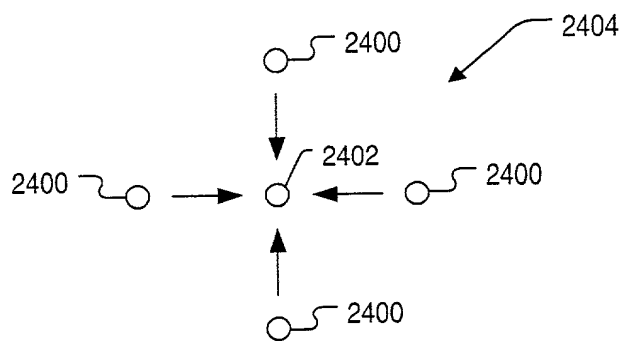


FIG. 49

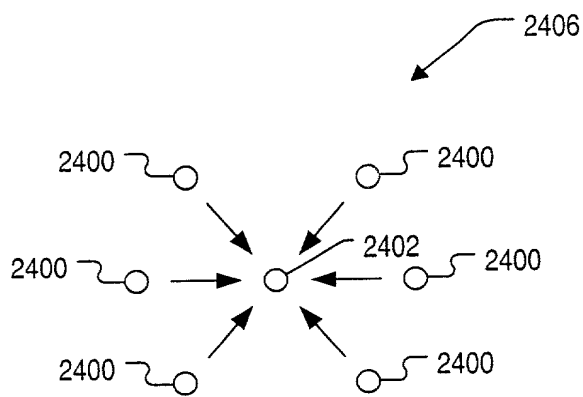


FIG. 50

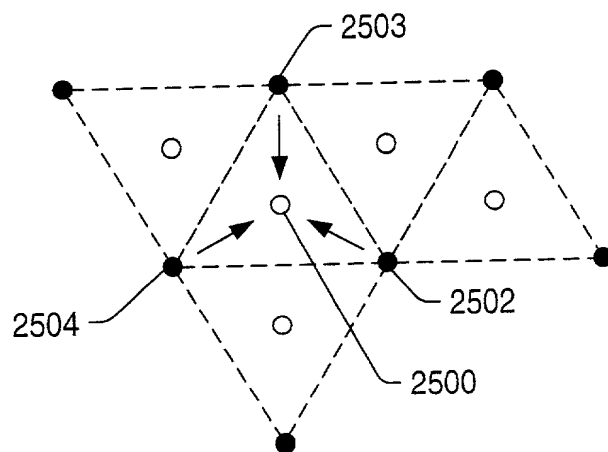


FIG. 51

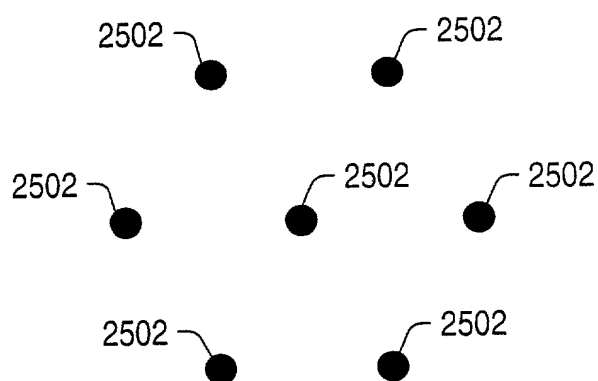


FIG. 52

FIG. 53 is a schematic diagram of a system for monitoring a process. The system includes a sensor 2500, a controller 2502, and a display 2504. The sensor 2500 is connected to the controller 2502, which is connected to the display 2504. The display 2504 displays a graph 2506 showing the process data. The graph 2506 has a horizontal axis 2508 and a vertical axis 2510. The graph 2506 shows a series of peaks and valleys. The peaks are labeled 2512 and the valleys are labeled 2514. The sensor 2500 is positioned at the center of the graph 2506. The controller 2502 is positioned to the left of the graph 2506. The display 2504 is positioned to the right of the graph 2506.

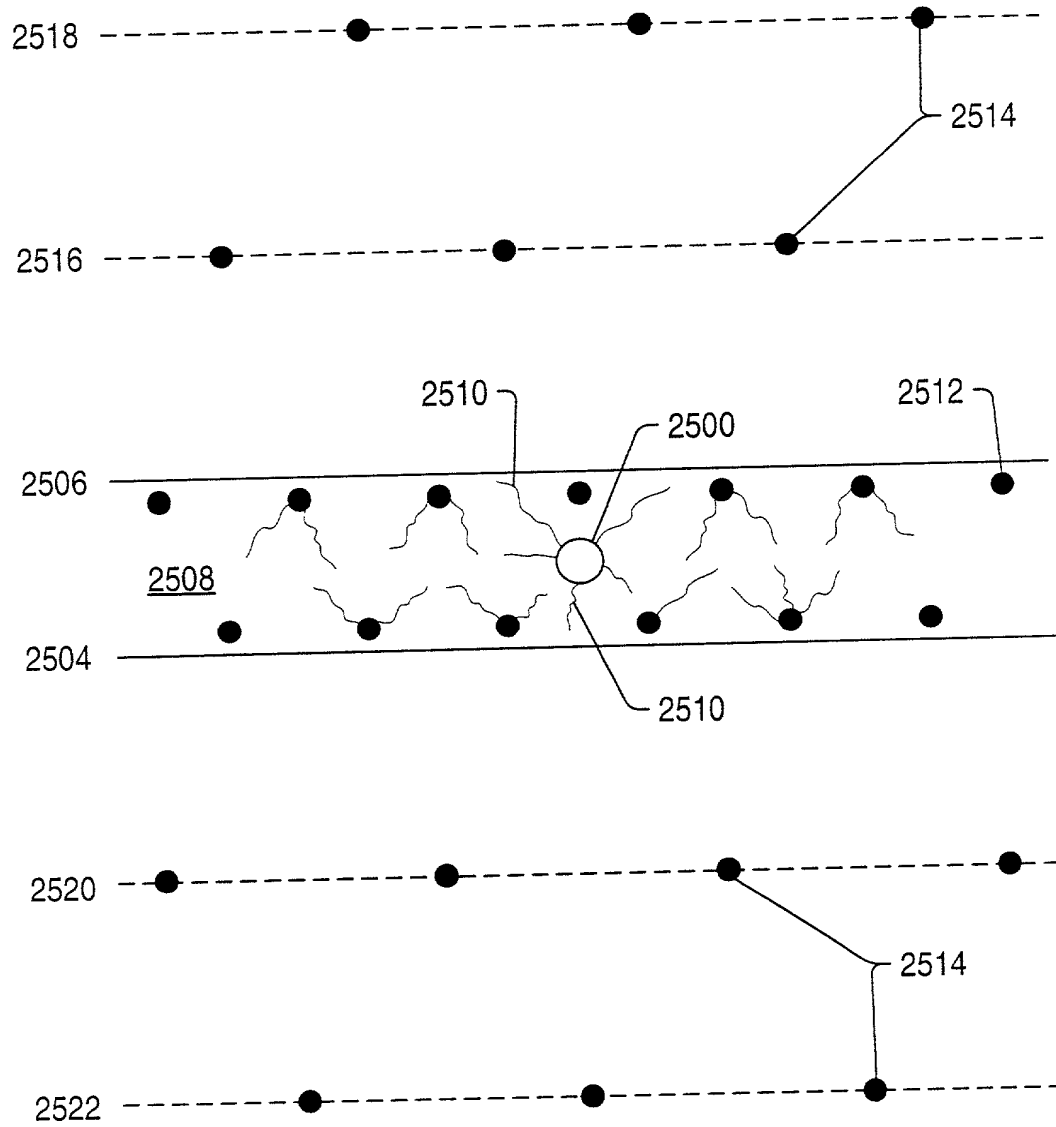


FIG. 53

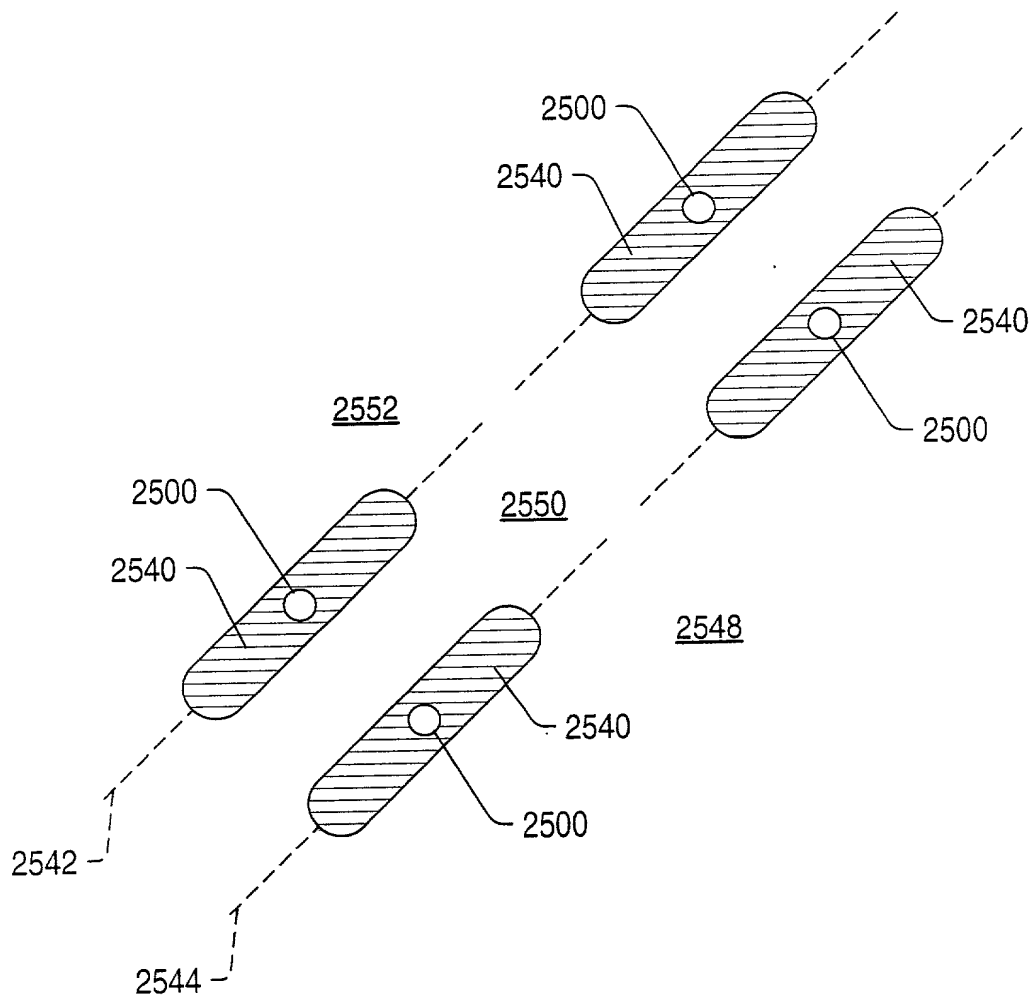


FIG. 54

FIG. 55 is a schematic diagram of a multi-layered structure. The structure consists of a central core 2600, which is a solid line. Above and below the core are two layers of dashed lines, 2602 and 2606, respectively. Each dashed line layer contains a series of dots, 2604, which are connected by a dashed line, 2608. The dots 2604 are positioned at regular intervals along the dashed lines 2602 and 2606. Arrows point from the dots 2604 on the dashed line 2602 towards the core 2600, and arrows point from the dots 2604 on the dashed line 2606 towards the core 2600. The entire structure is labeled 2600.

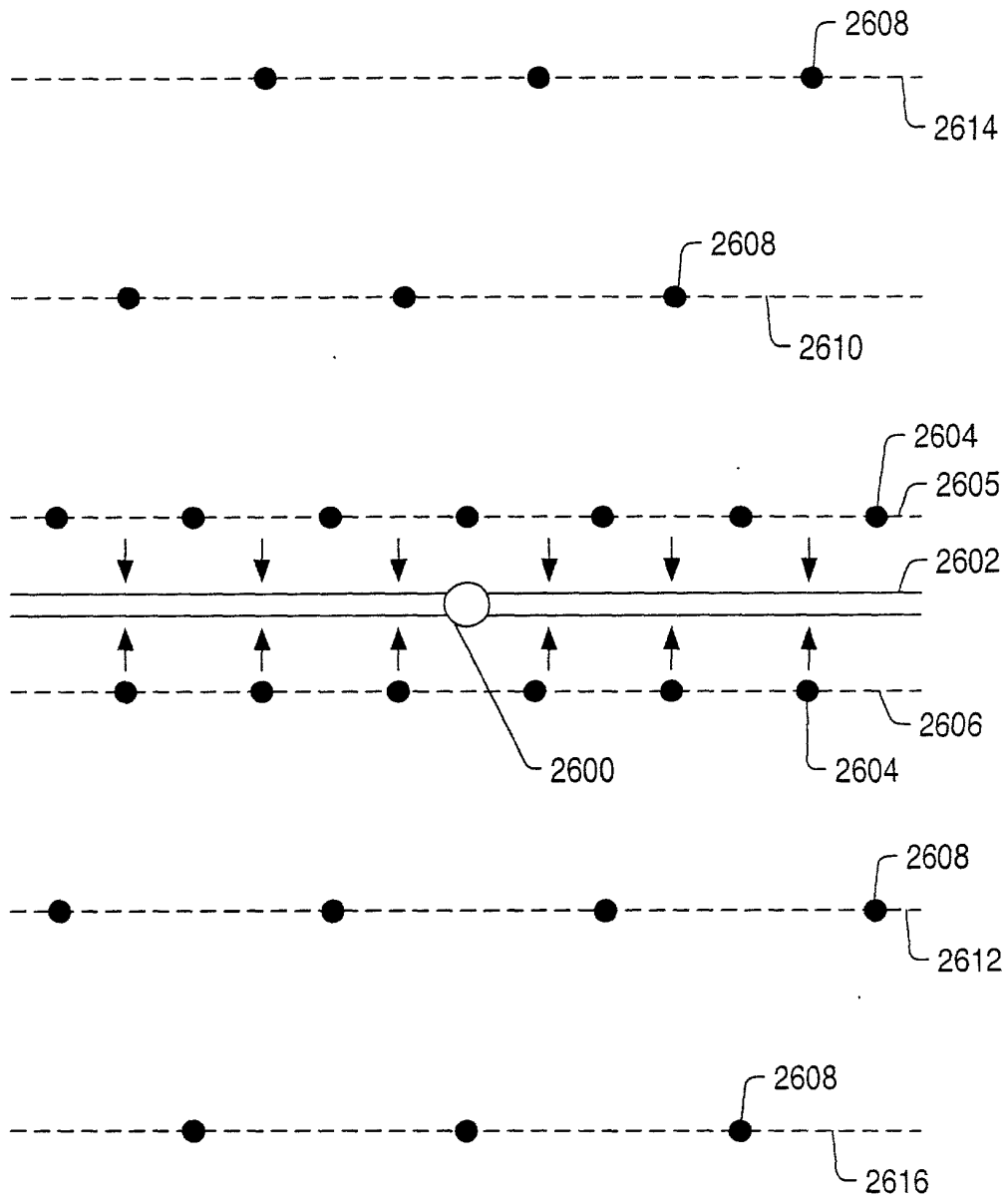


FIG. 55

FIG. 56 is a schematic diagram of a system 2600. The system 2600 includes a first set of parallel lines 2640, a second set of parallel lines 2640, and a third set of parallel lines 2640. The first set of parallel lines 2640 is connected to a first terminal 2646. The second set of parallel lines 2640 is connected to a second terminal 2645. The third set of parallel lines 2640 is connected to a third terminal 2640. The first set of parallel lines 2640 is connected to a first terminal 2646. The second set of parallel lines 2640 is connected to a second terminal 2645. The third set of parallel lines 2640 is connected to a third terminal 2640.

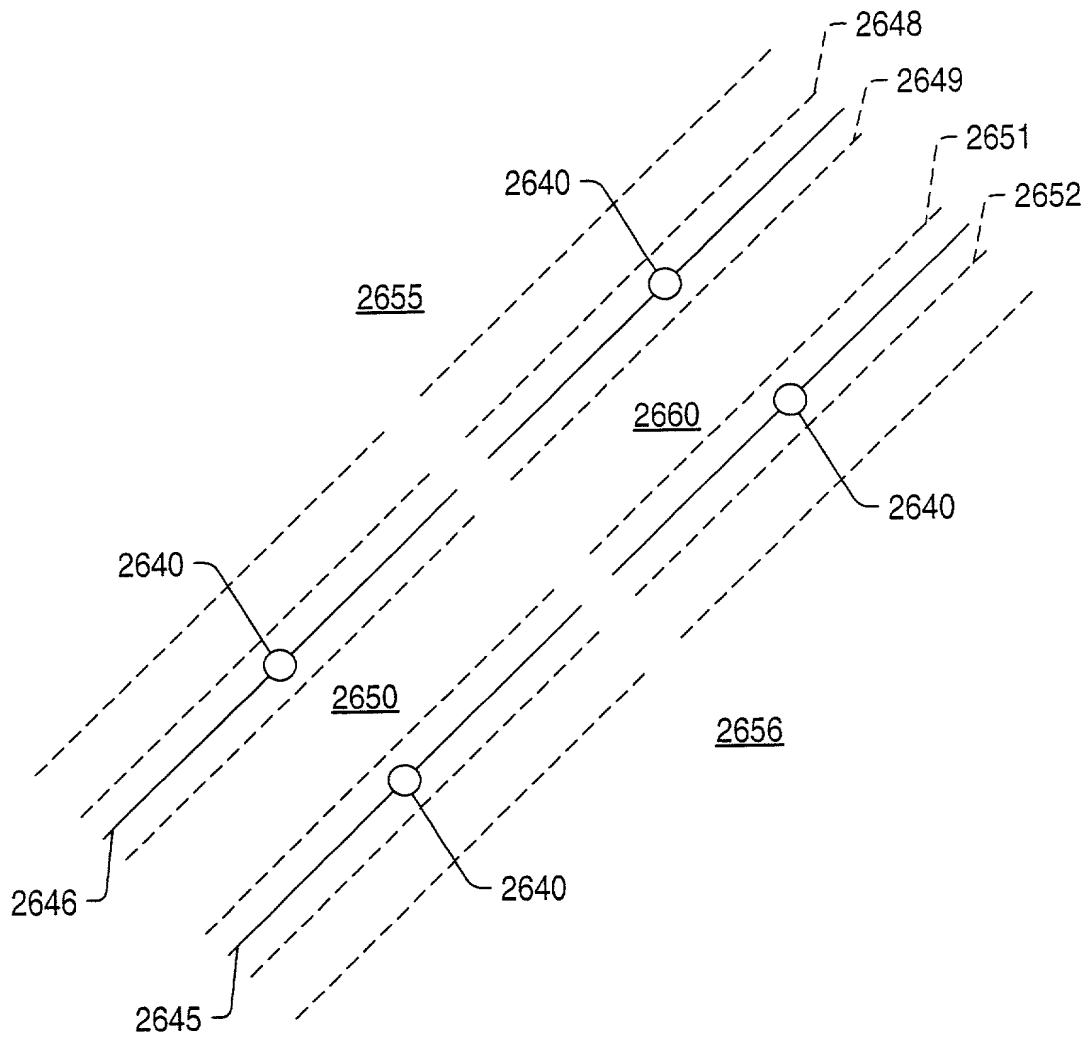


FIG. 56

FIG. 57 is a schematic diagram of a hexagonal lattice structure. The lattice is composed of a central hexagonal unit (2701) and six surrounding hexagonal units (2702, 2703, 2704, 2705, 2706, 2707). The central unit (2701) is a solid hexagon. The surrounding units (2702, 2703, 2704, 2705, 2706, 2707) are dashed hexagons. Arrows indicate the direction of flow or movement from the central unit (2701) towards the surrounding units (2702, 2703, 2704, 2705, 2706, 2707). The arrows point from the central unit (2701) to the surrounding units (2702, 2703, 2704, 2705, 2706, 2707) and from the surrounding units (2702, 2703, 2704, 2705, 2706, 2707) to the central unit (2701).

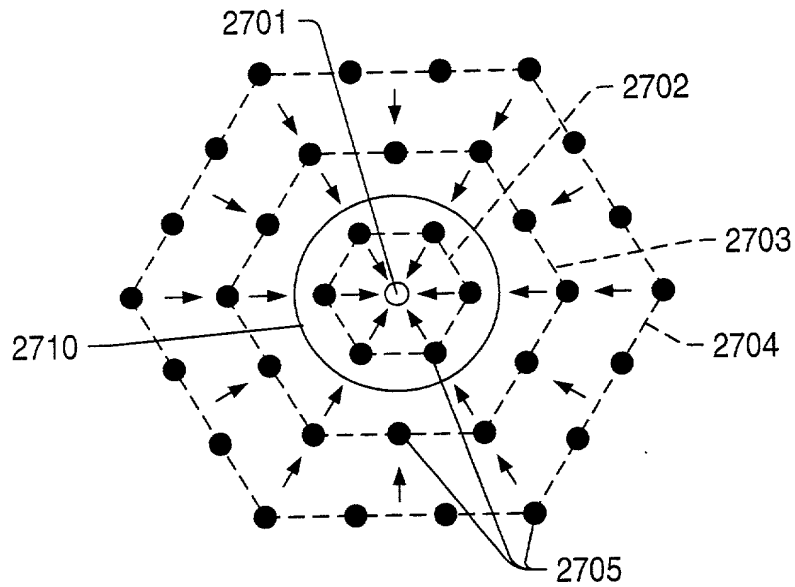


FIG. 57

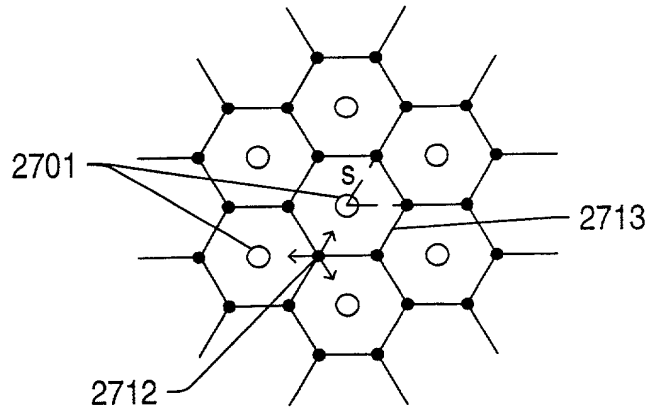


FIG. 58

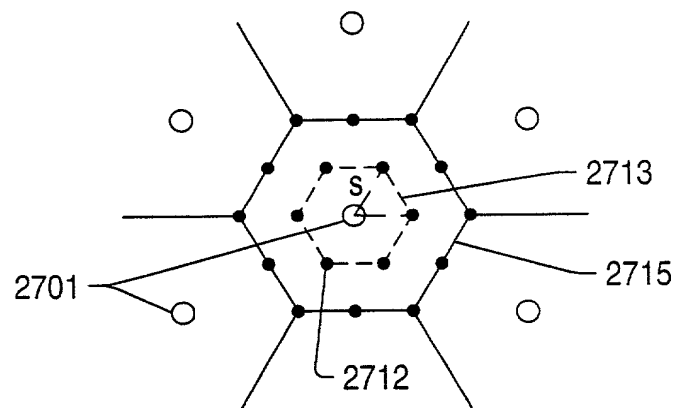


FIG. 59

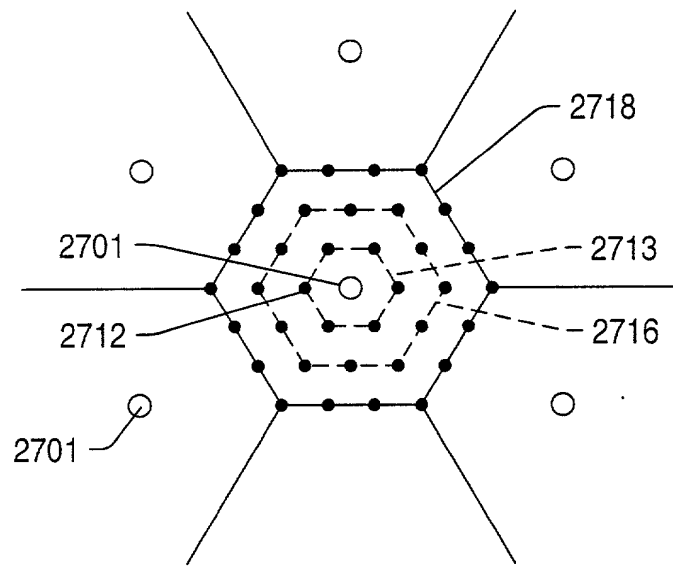


FIG. 60

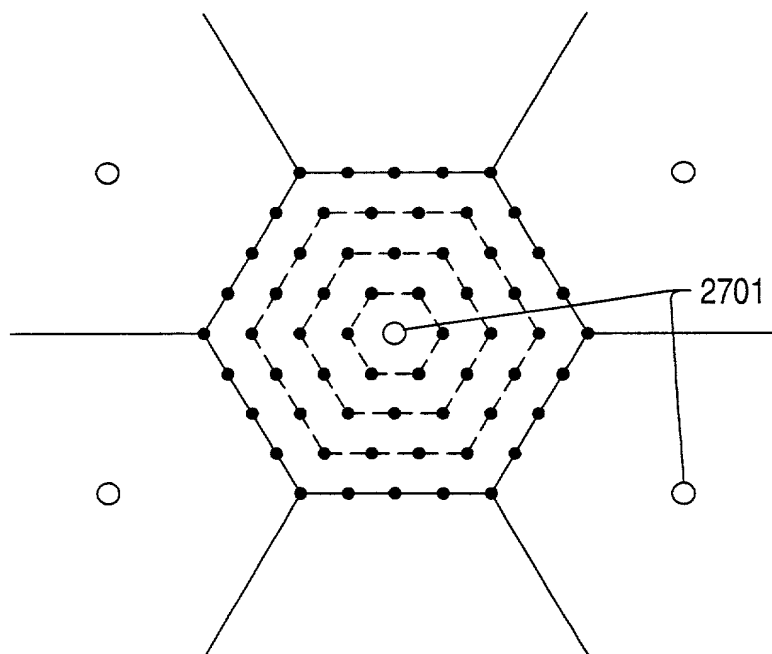


FIG. 61

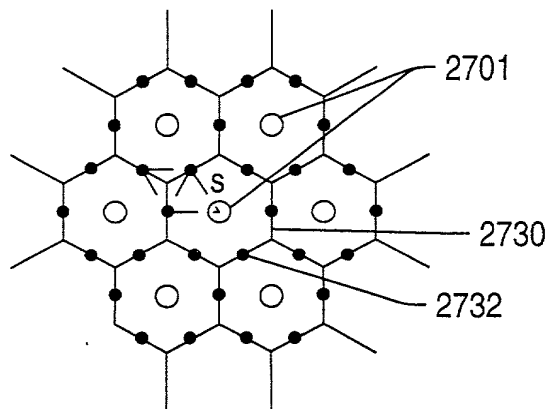


FIG. 62

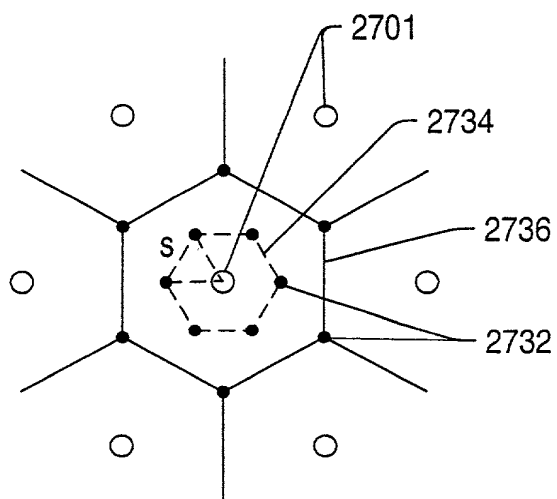


FIG. 63

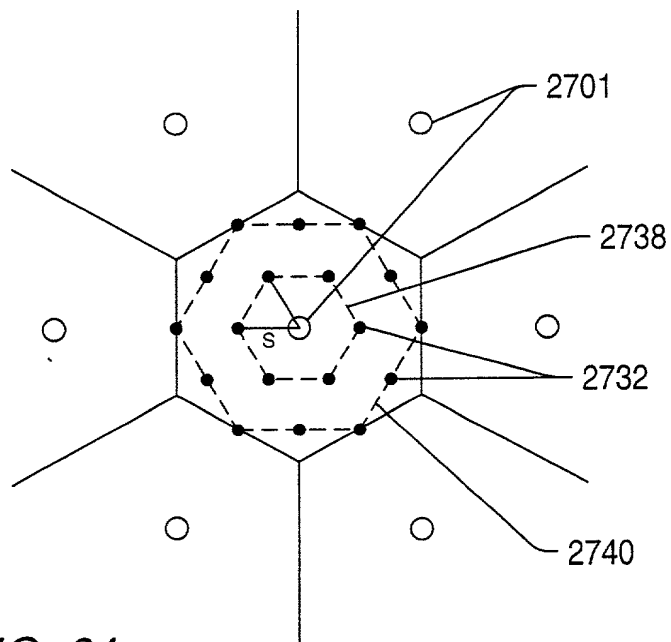


FIG. 64

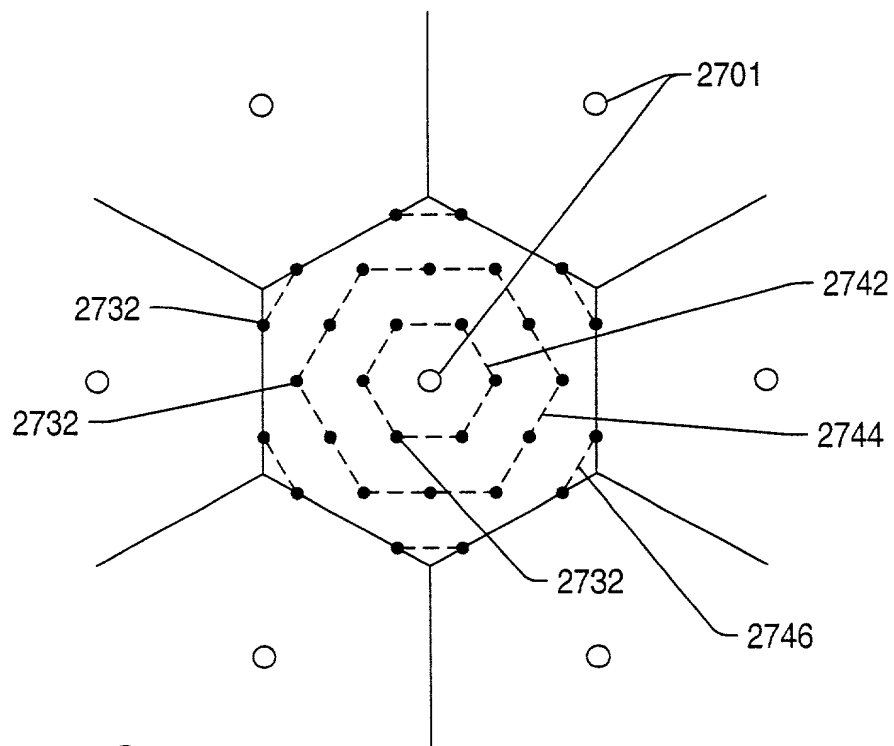


FIG. 65

FIG. 66 is a schematic diagram of a hexagonal lattice structure. The lattice is composed of solid black dots at the vertices of a hexagonal grid. A dashed line forms a triangle within the lattice, with its vertices labeled 'S'. Three labels with leader lines point to specific features: 2760 points to a solid dot, 2762 points to a dashed line, and 2764 points to a solid line.

FIG. 66

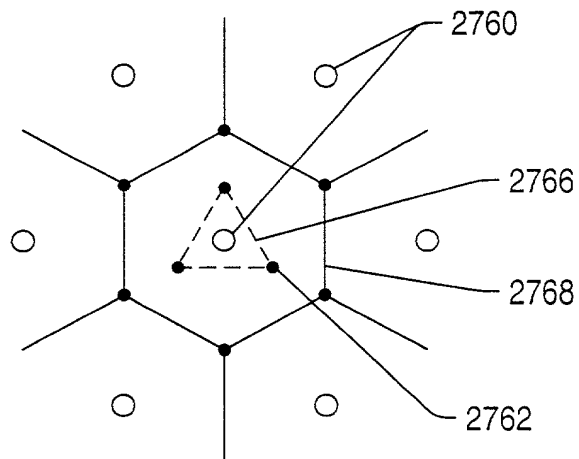
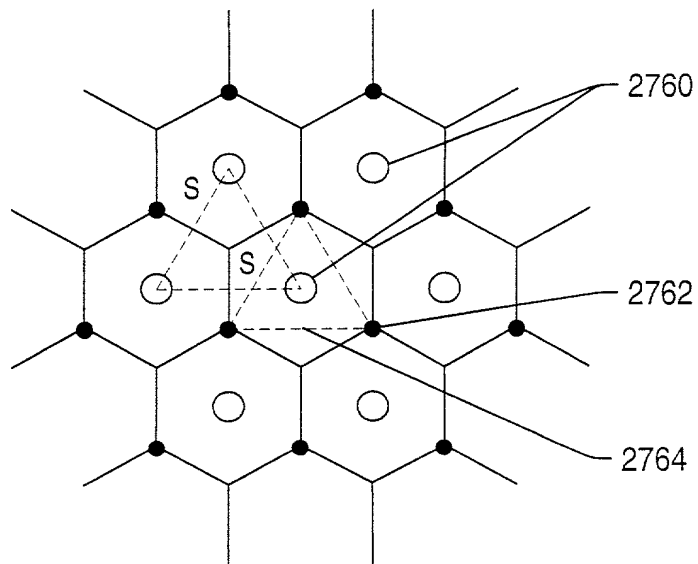


FIG. 67

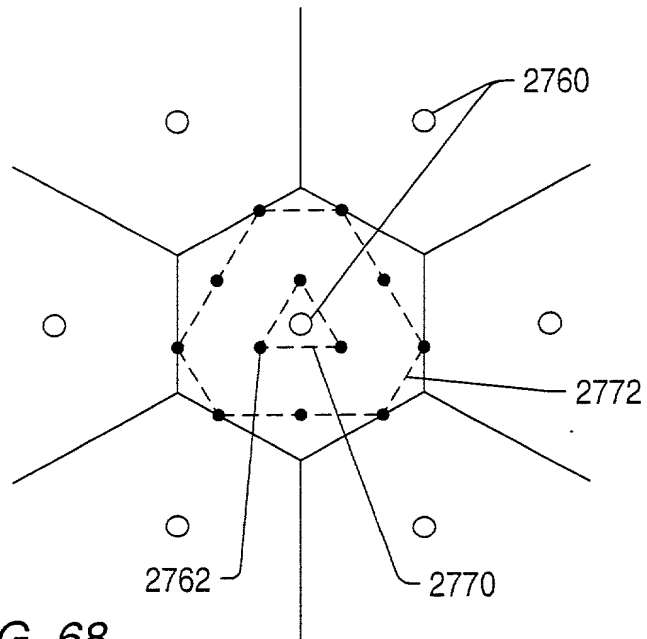


FIG. 68

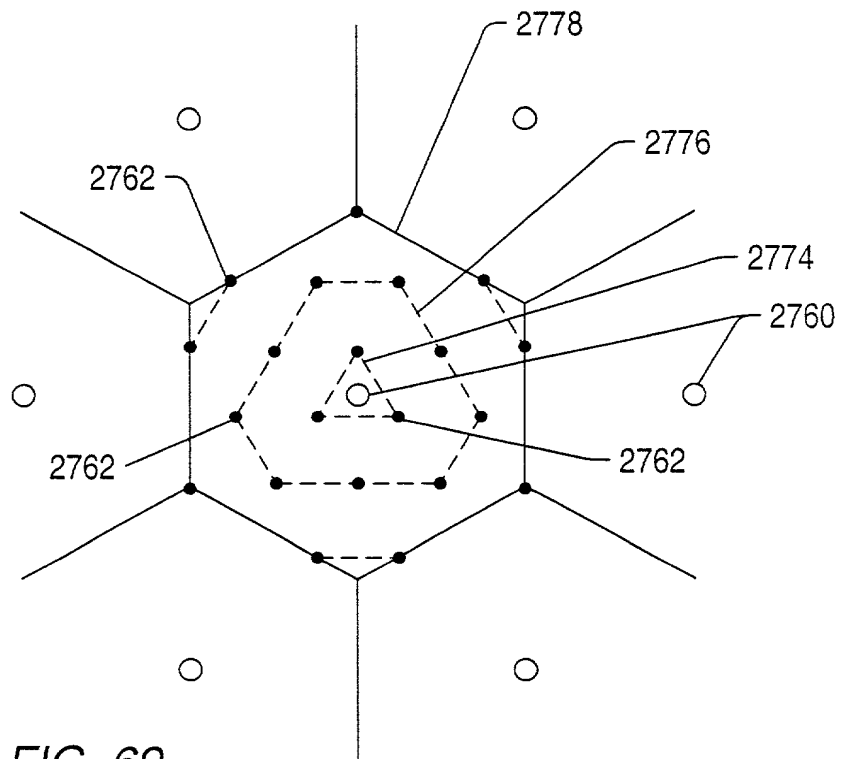


FIG. 69

FIG. 70 is a schematic diagram of a triangular lattice structure. The lattice is composed of solid lines forming a large triangle with internal dashed lines. A central node is labeled 2705. Other nodes are labeled 2701, 2780, 2784, and 2782. Arrows indicate a flow or direction within the lattice structure.

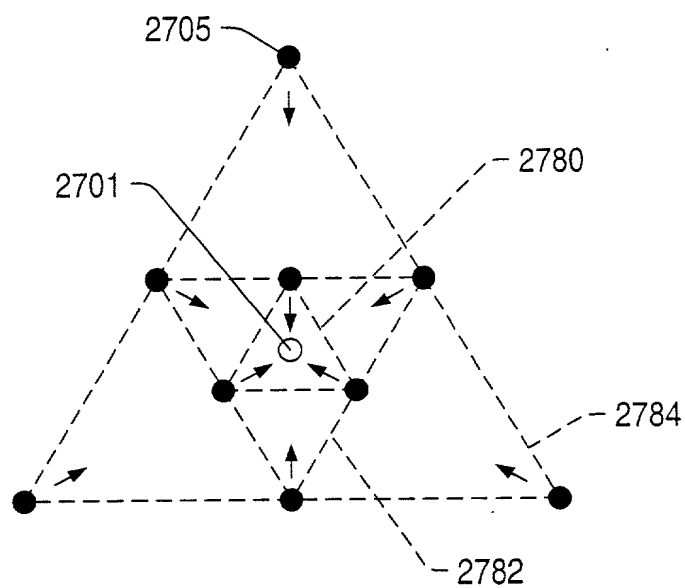


FIG. 70

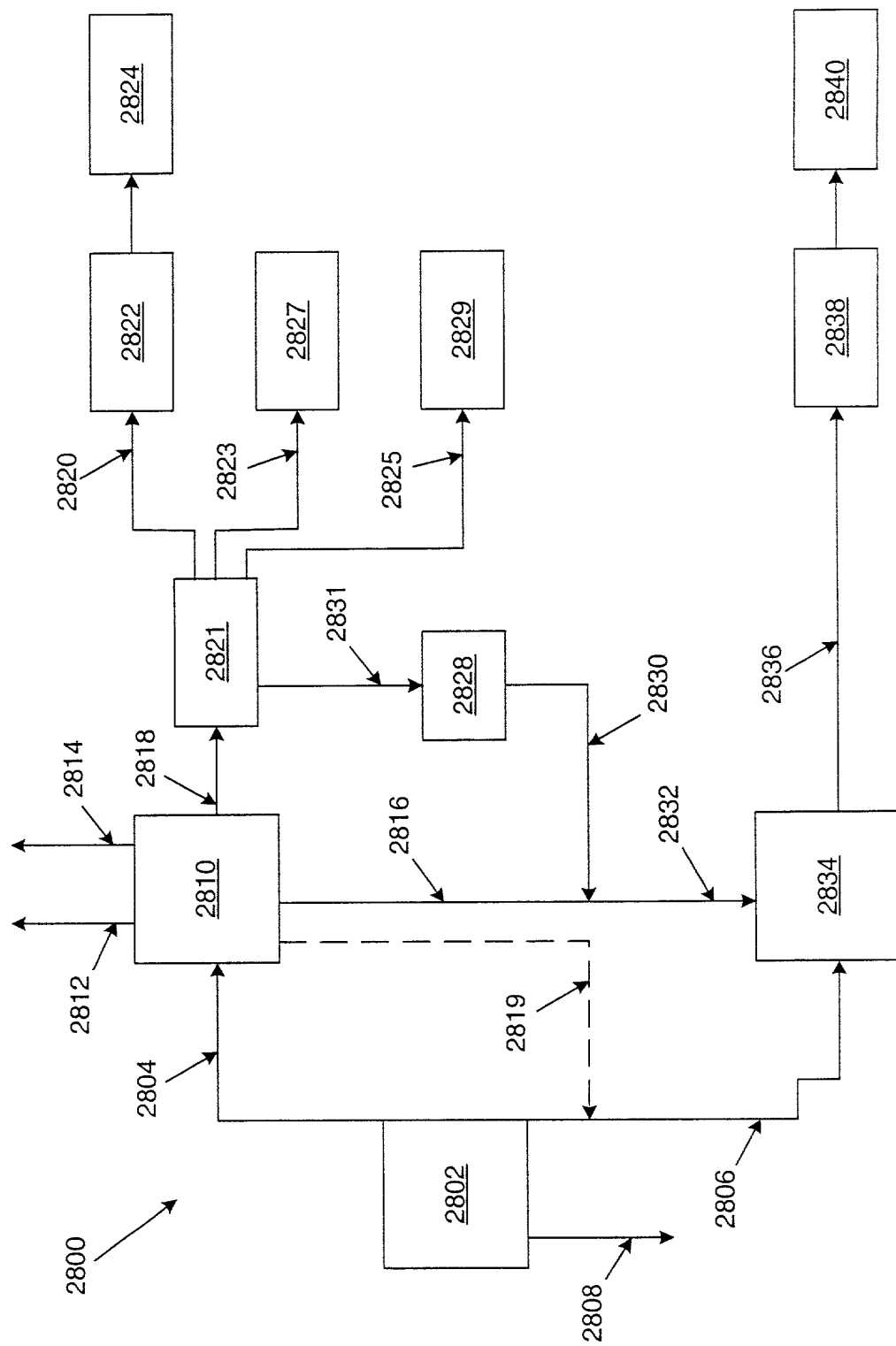


Fig. 71

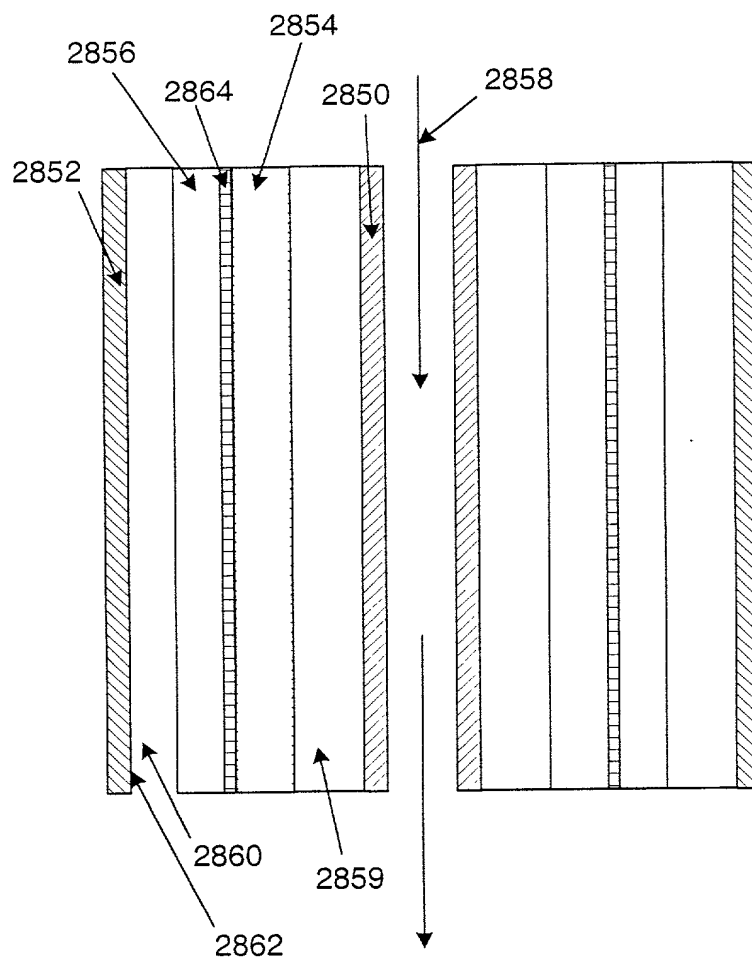


Fig. 72

FIG. 73 is a block diagram of a system 2800. The system 2800 includes a first processing unit 2900, a second processing unit 2906, a third processing unit 2930, and a fourth processing unit 2910. The first processing unit 2900 is connected to the second processing unit 2906 via a bus 2907. The second processing unit 2906 is connected to the third processing unit 2930 via a bus 2907. The third processing unit 2930 is connected to the fourth processing unit 2910 via a bus 2907. The fourth processing unit 2910 is connected to a fifth processing unit 2912 via a bus 2907. The fifth processing unit 2912 is connected to a sixth processing unit 2914 via a bus 2907. The sixth processing unit 2914 is connected to a seventh processing unit 2916 via a bus 2907. The seventh processing unit 2916 is connected to an eighth processing unit 2918 via a bus 2907. The eighth processing unit 2918 is connected to a ninth processing unit 2920 via a bus 2907. The ninth processing unit 2920 is connected to a tenth processing unit 2922 via a bus 2907. The tenth processing unit 2922 is connected to an eleventh processing unit 2924 via a bus 2907. The eleventh processing unit 2924 is connected to a twelfth processing unit 2926 via a bus 2907. The twelfth processing unit 2926 is connected to a thirteenth processing unit 2928 via a bus 2907.

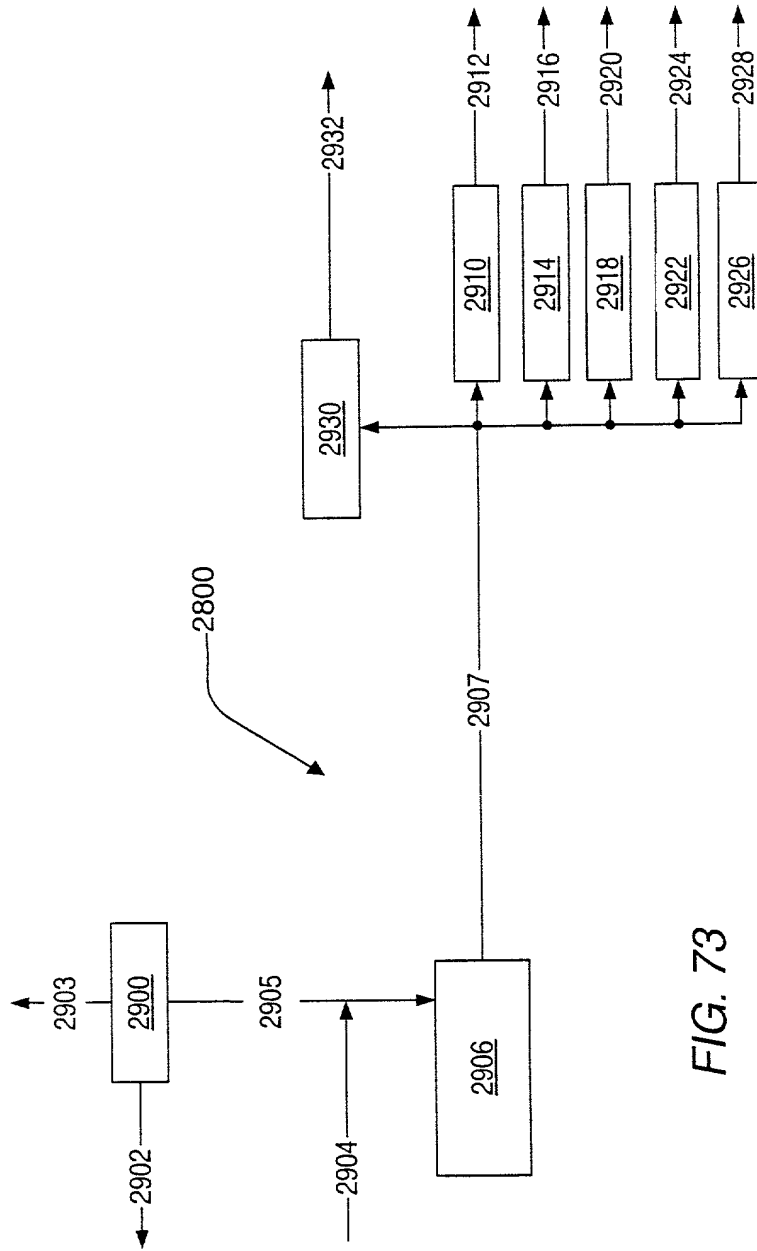


FIG. 73

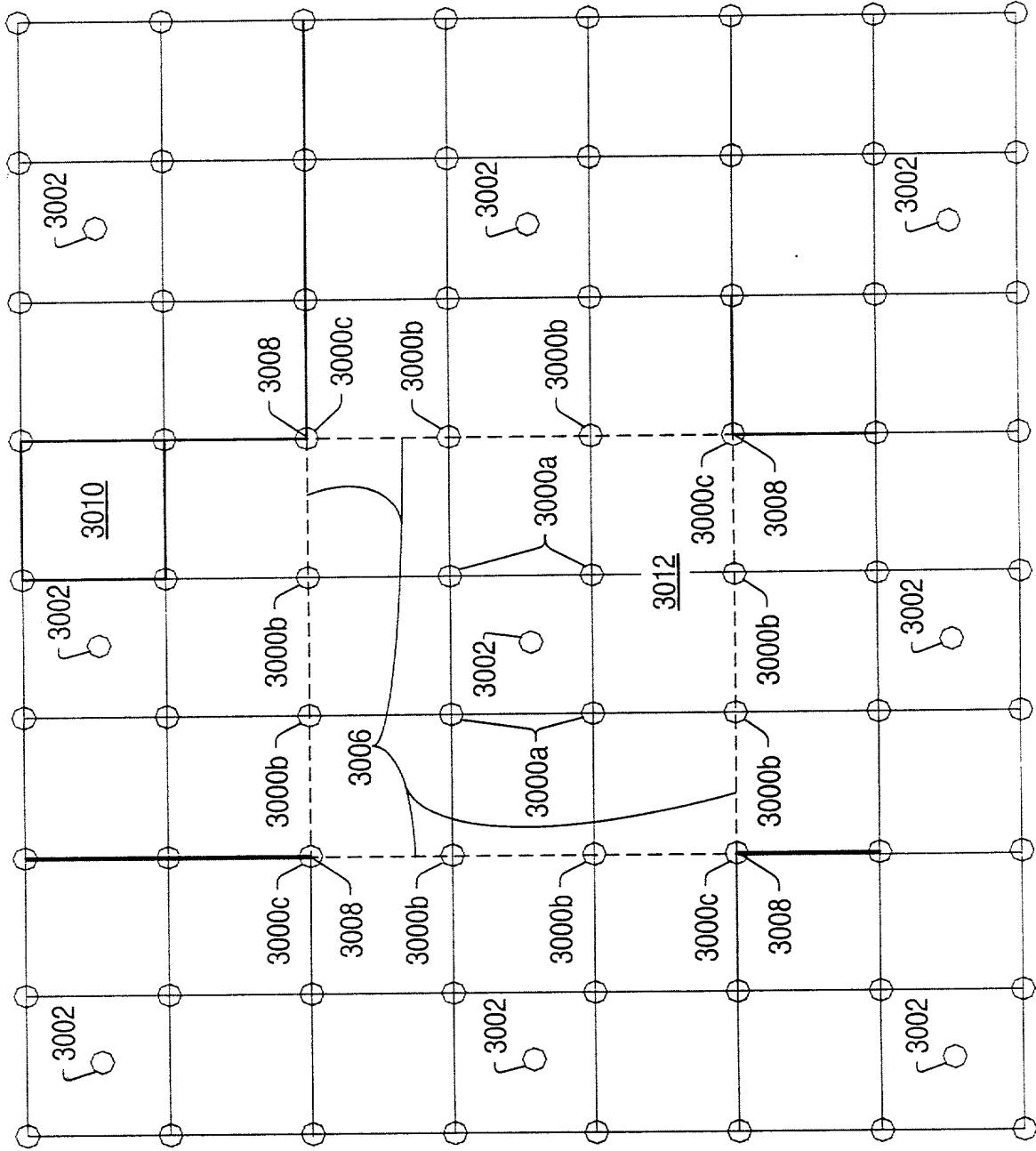


FIG. 74

FIG. 75 is a schematic diagram of a hexagonal lattice structure. The lattice is composed of hexagonal cells. A central hexagonal cell is labeled 3000. It is surrounded by six other hexagonal cells, each labeled 3002. These six cells are further surrounded by a ring of twelve hexagonal cells, each labeled 3006. The outermost ring consists of twelve hexagonal cells, each labeled 3008. The diagram illustrates a hierarchical structure where the central cell 3000 is connected to the inner ring 3002, which is connected to the middle ring 3006, and finally to the outer ring 3008. The connections are shown as solid lines between the centers of the hexagonal cells. Dashed lines are used to indicate connections between the centers of the hexagonal cells in the middle ring 3006 and the outer ring 3008. Specifically, dashed lines connect the center of cell 3006 to the centers of cells 3008. A label 3014 is also present, pointing to a dashed line connecting the center of cell 3006 to the center of cell 3008.

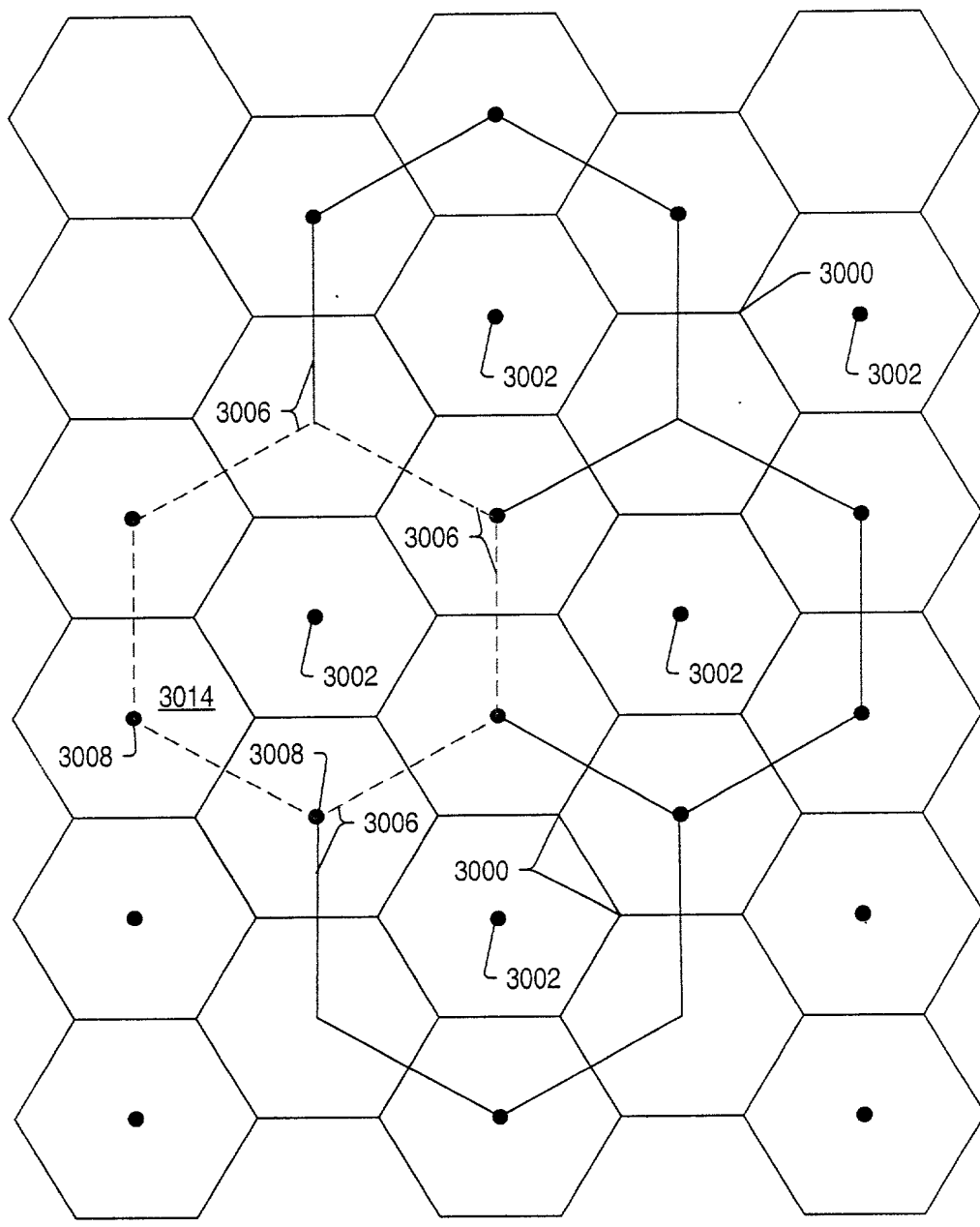


FIG. 75

FIG. 76 is a schematic diagram of a hexagonal lattice structure. The lattice is composed of a central hexagon surrounded by six other hexagons, forming a larger hexagonal shape. The vertices of the lattice are marked with black dots. The edges of the lattice are labeled with reference numerals: 3100 for the outer boundary, 3102 for the inner boundary, 3116 for the edges of the central hexagon, and 3118 for the edges of the surrounding hexagons.

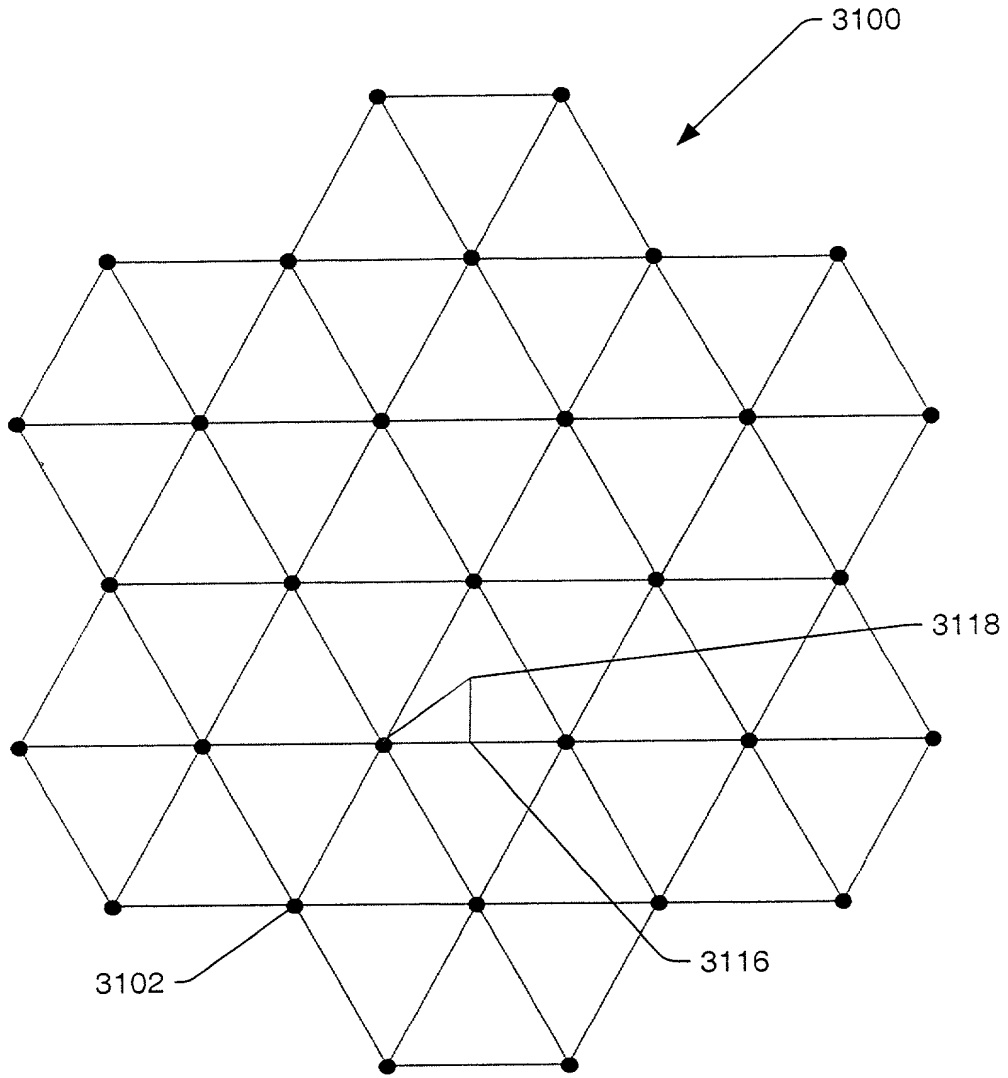


FIG. 76

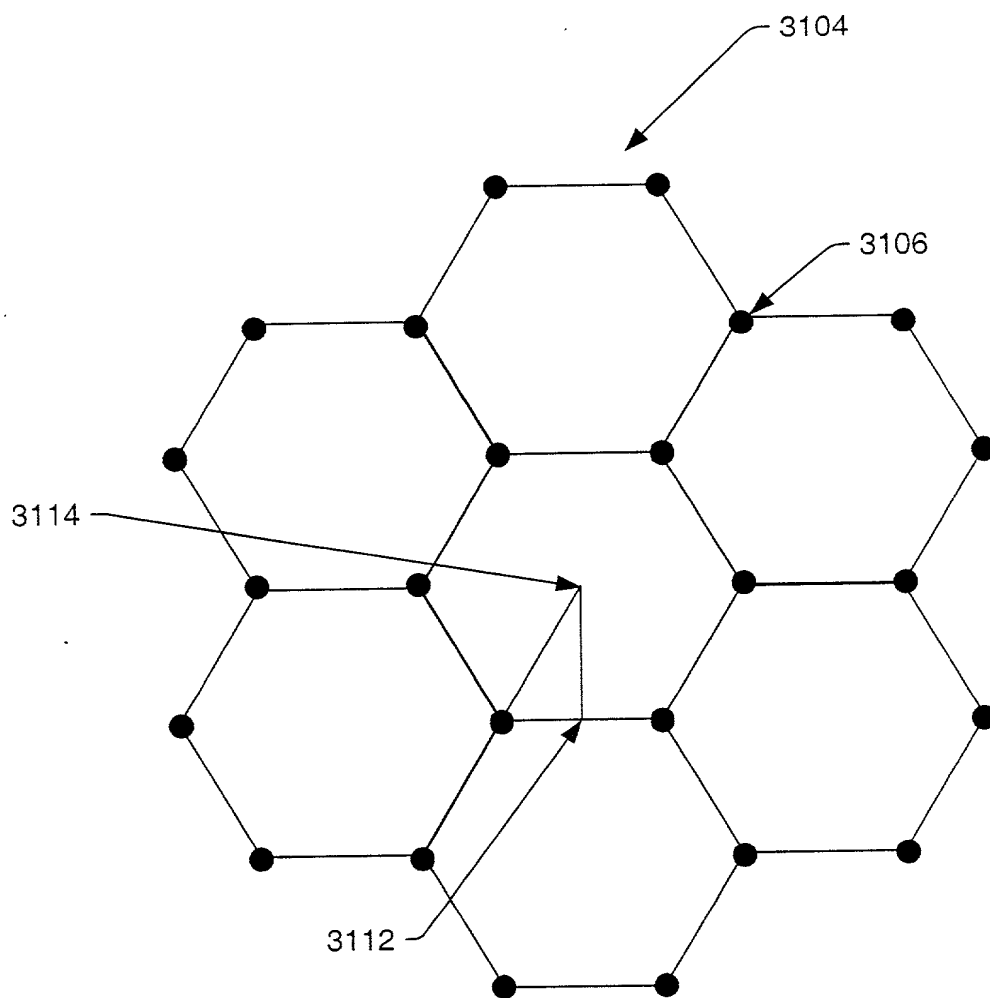


FIG. 77

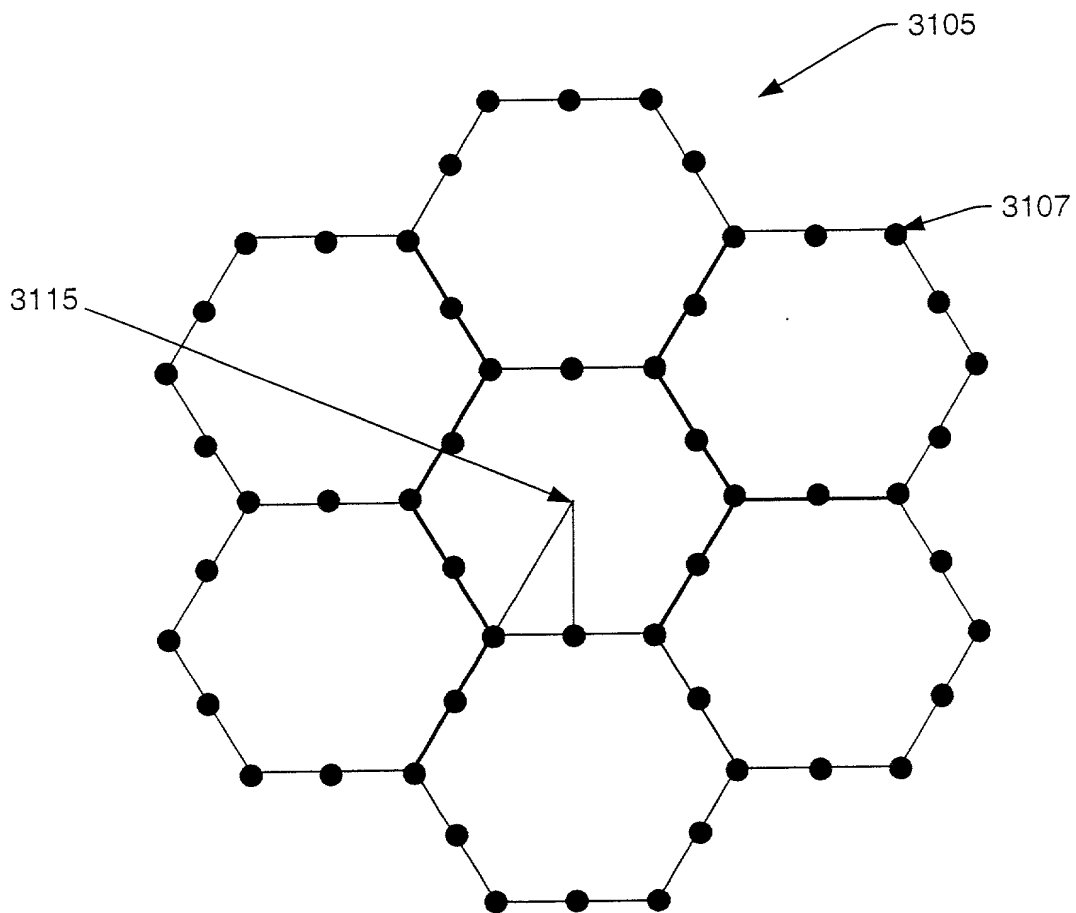


FIG. 77a

FIG. 78 is a 3D surface plot of the temperature distribution T (°C) as a function of the spatial coordinates x and y. The plot shows a complex, multi-peaked surface, indicating regions of high and low temperature. The x and y axes range from -10 to 10, and the temperature T ranges from 500 to 600 °C.

3110

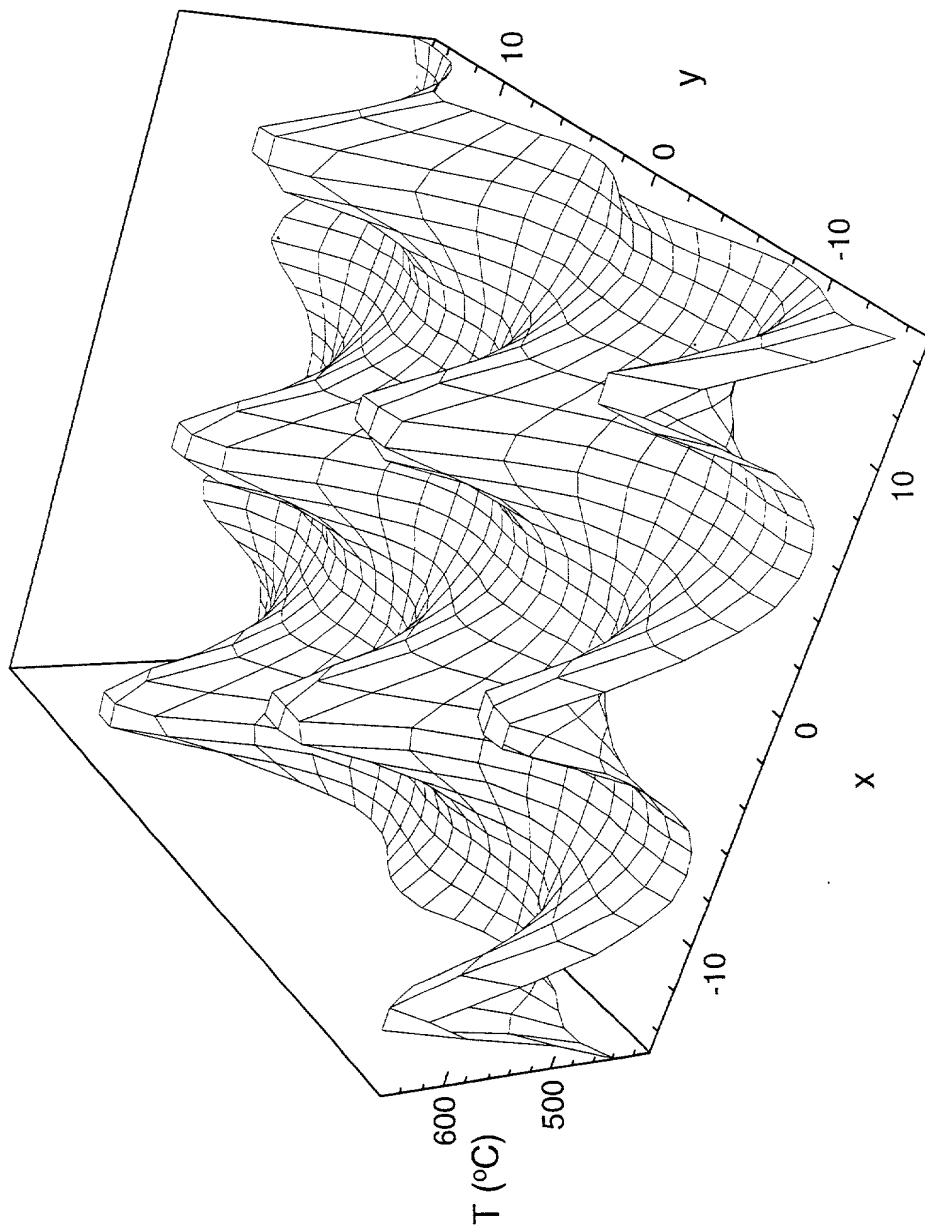


FIG. 78

3108

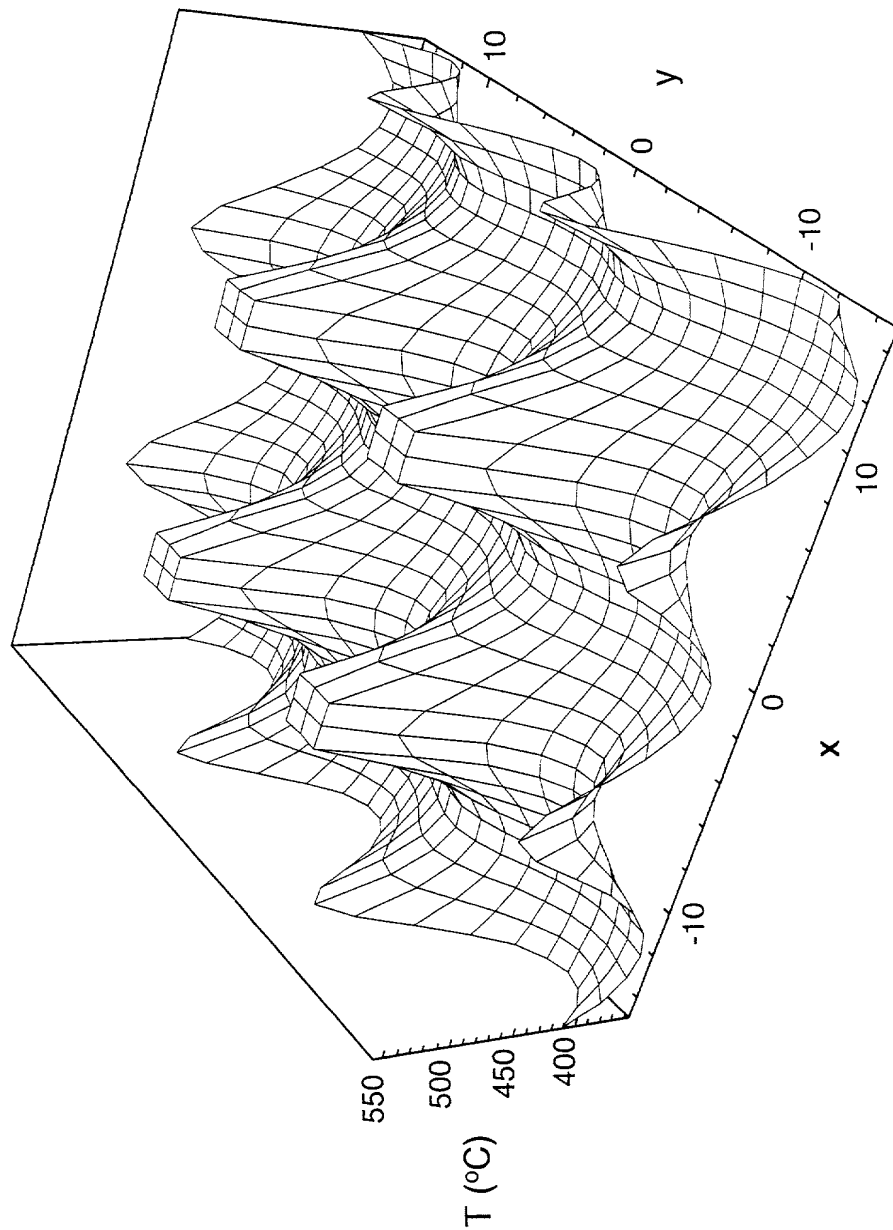


FIG. 79

3109

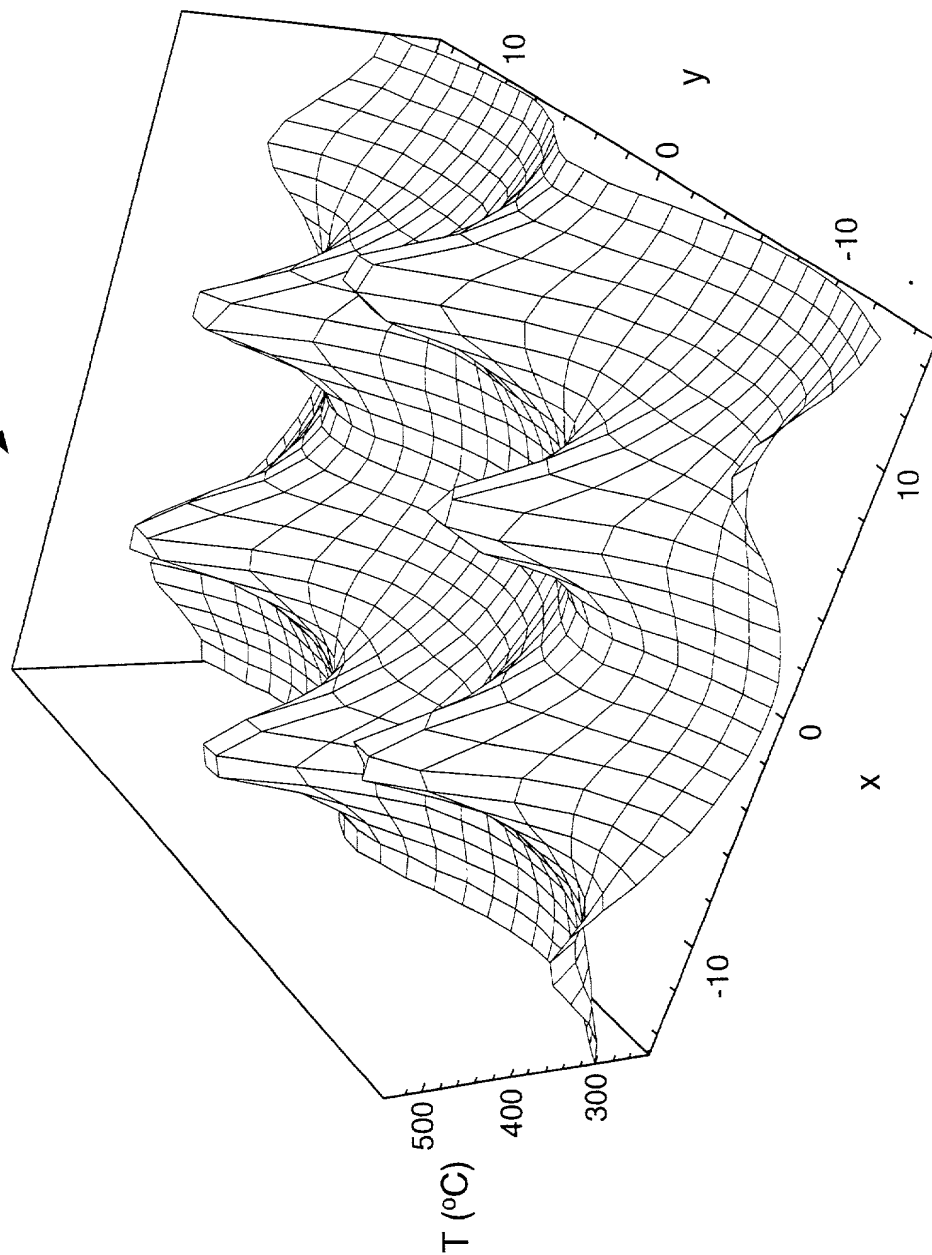


FIG. 79a

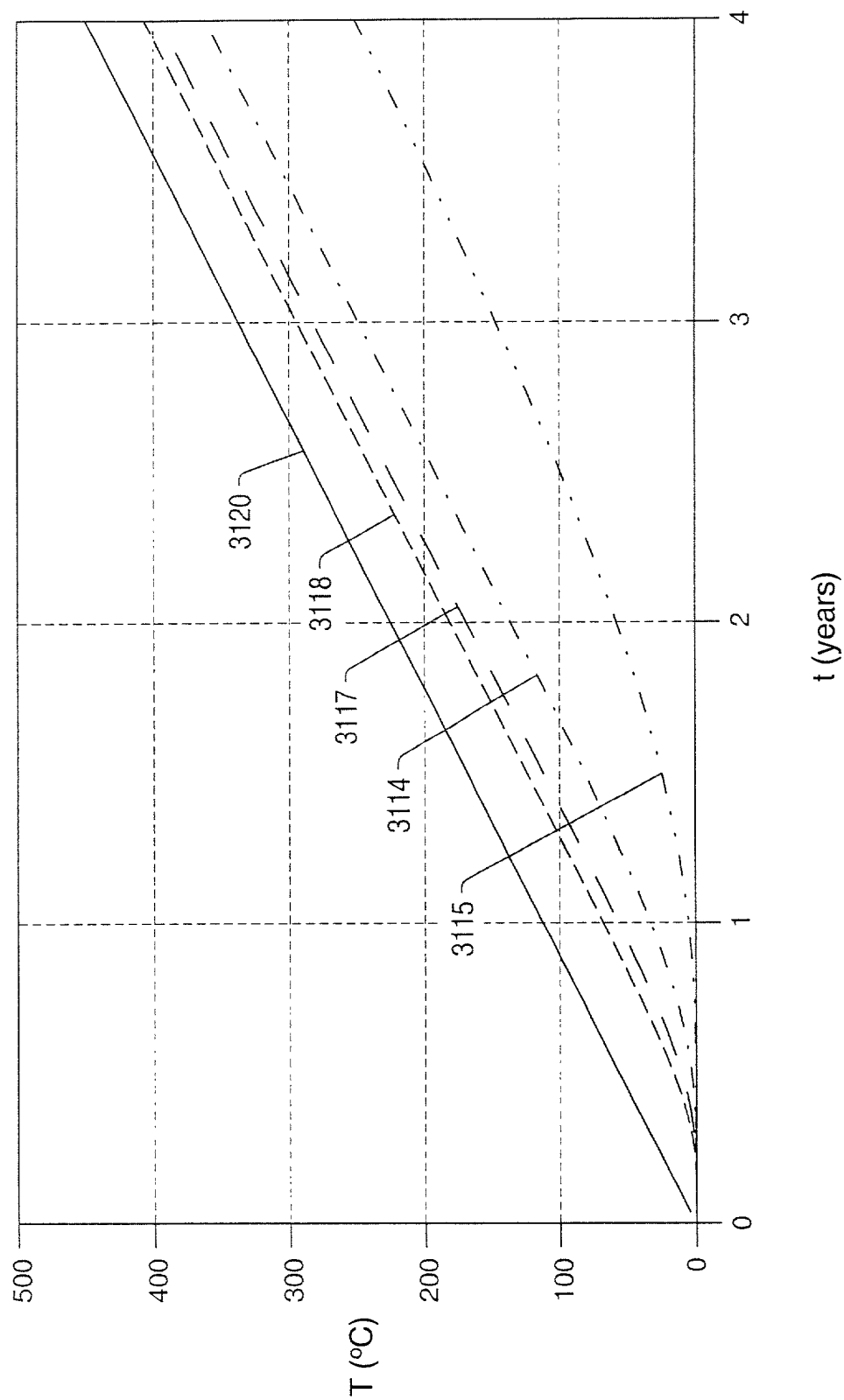


FIG. 80

FIG. 81 is a graph showing the temperature T (°C) versus time t (years) for various materials. The graph includes curves labeled 3114, 3116, 3118, 3112, and 3120, which represent different material types or conditions. The temperature T (°C) is plotted on the vertical axis, ranging from 0 to 500. The time t (years) is plotted on the horizontal axis, ranging from 0 to 4. The curves show that temperature decreases over time for all materials, with the rate of decrease varying between the different materials.

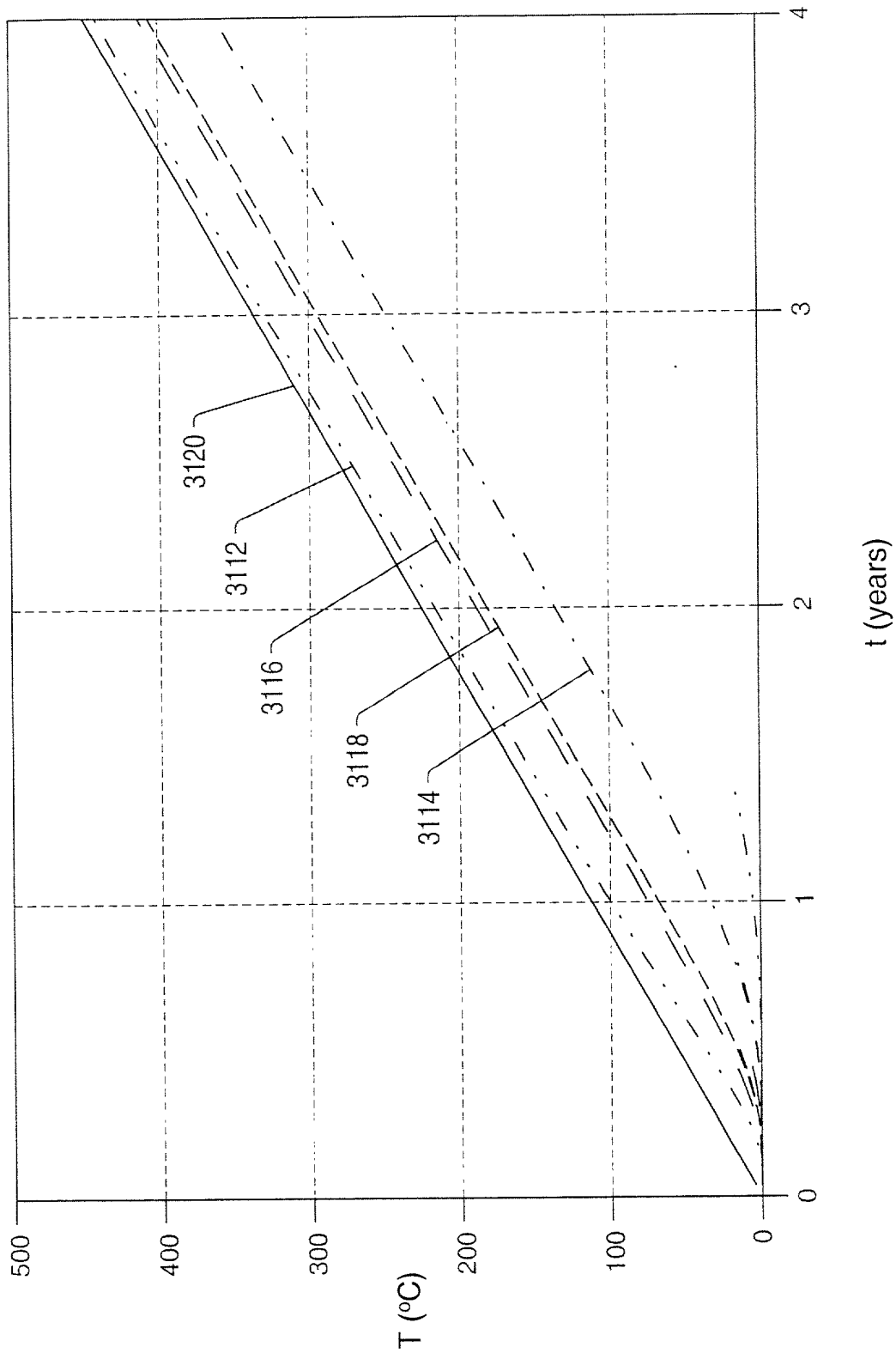


FIG. 81

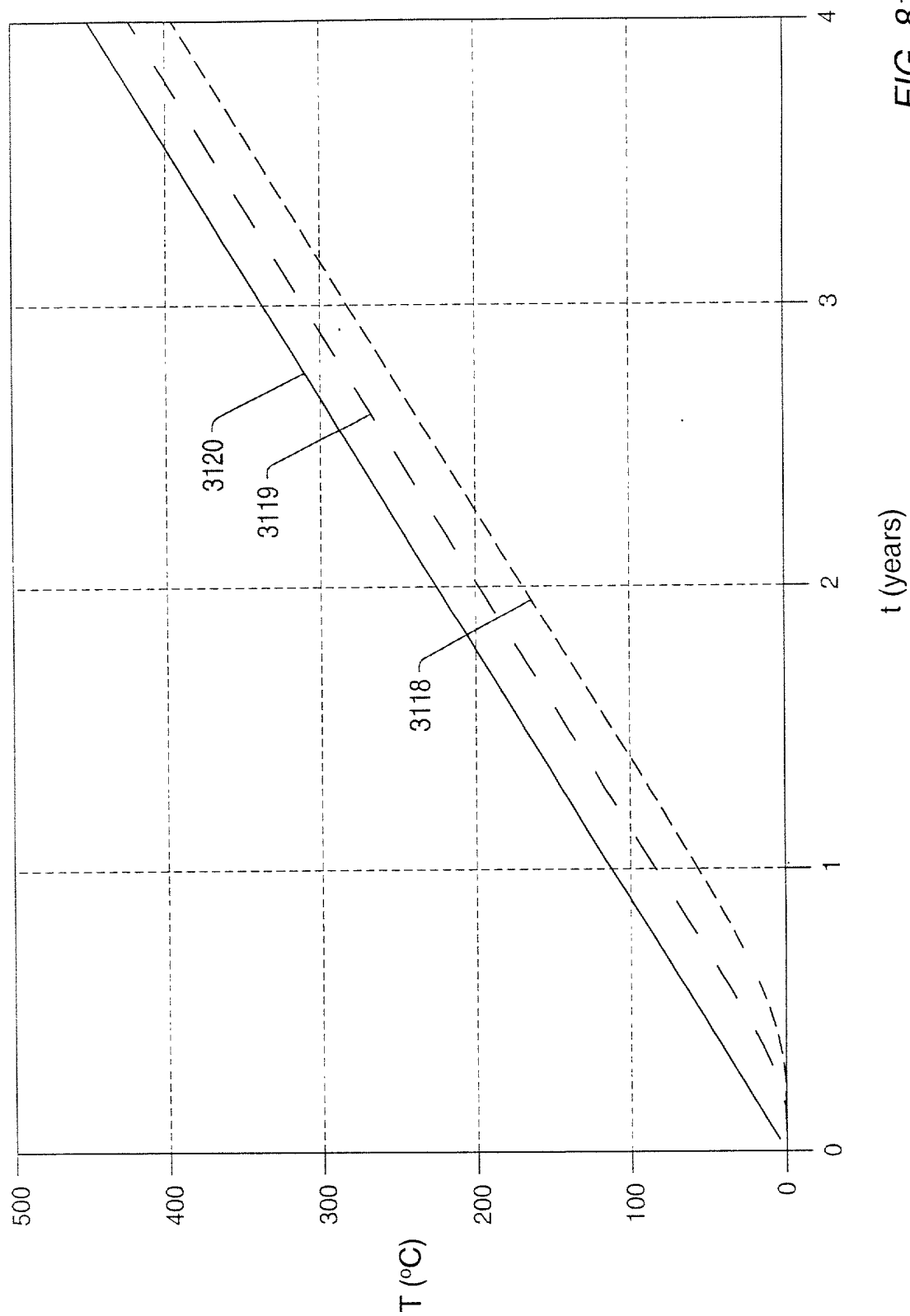


FIG. 81a

FIG. 81b is a graph showing the temperature T (°C) versus time t (years) for a system. The graph includes several curves labeled 3114, 3117, 3118, and 3120, which represent different thermal profiles over time.

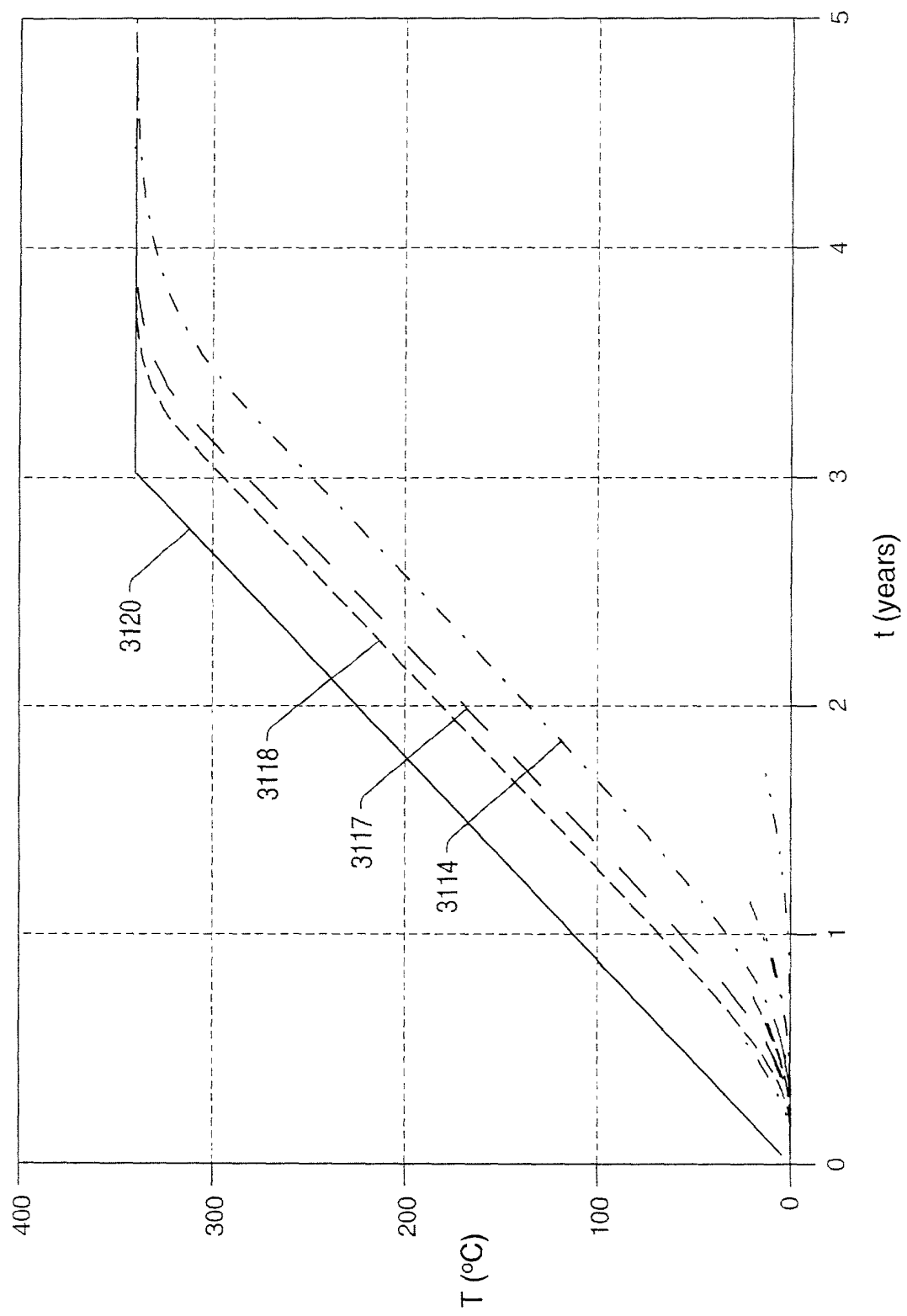


FIG. 81b

FIG. 82

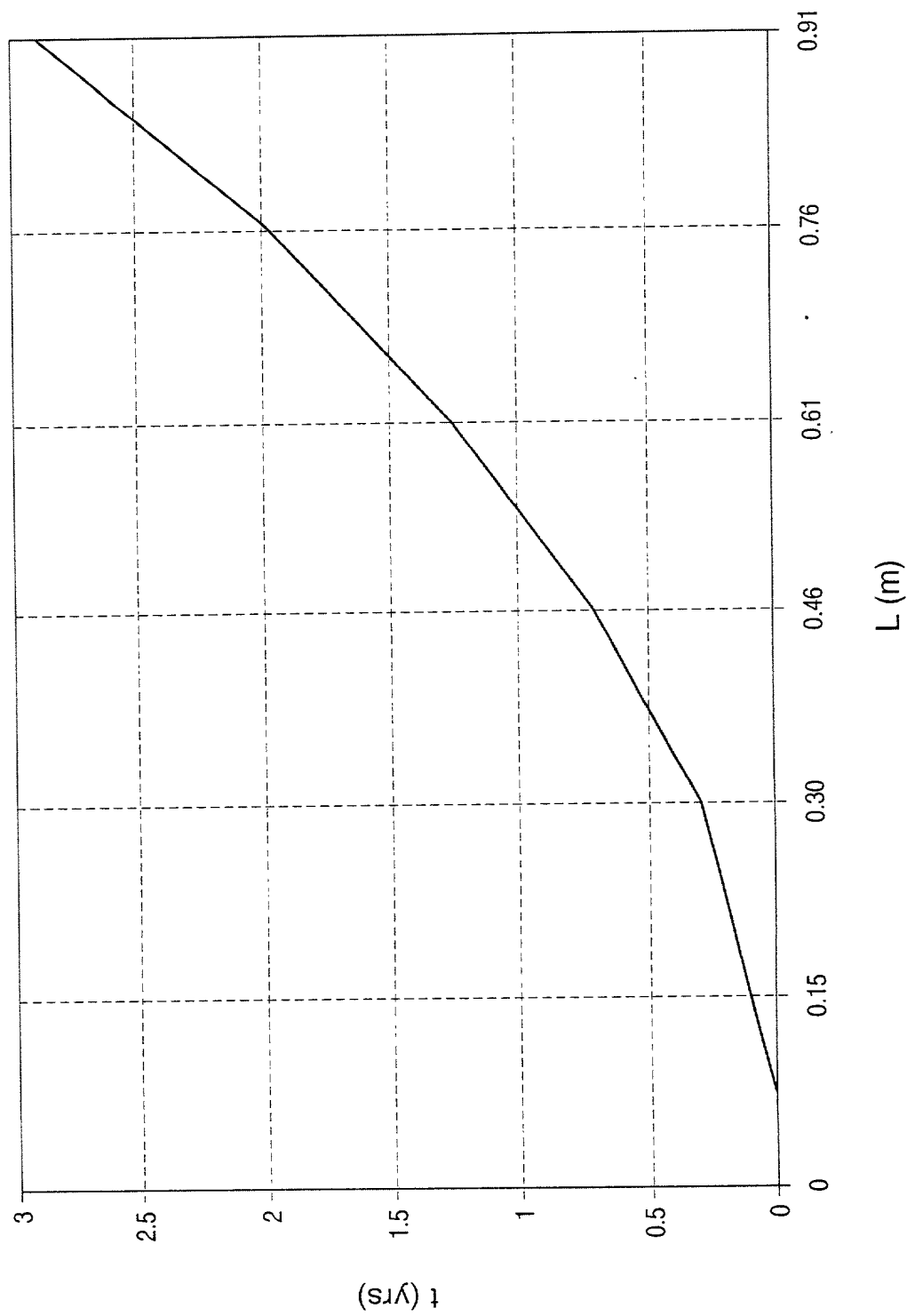


FIG. 82

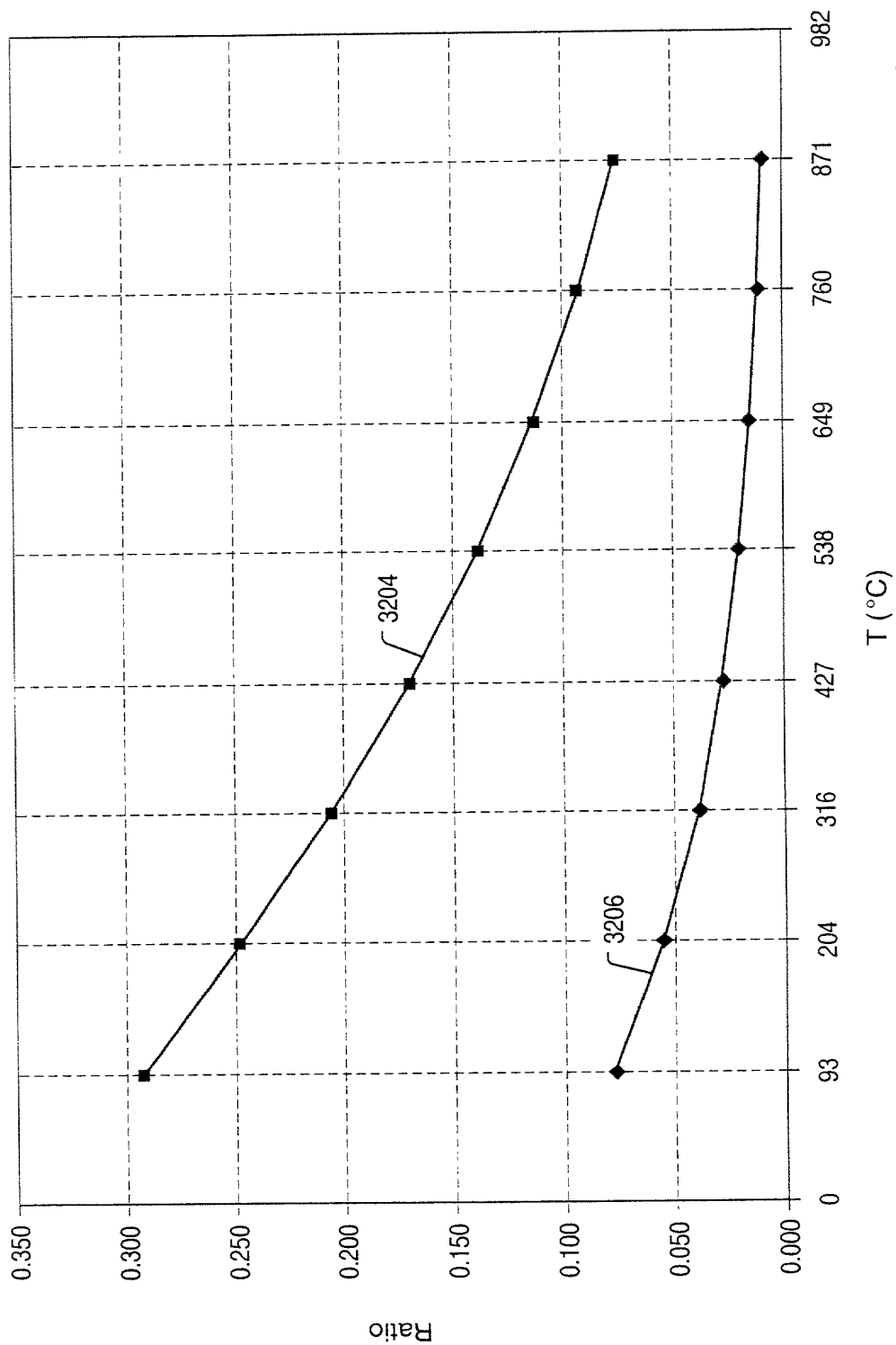


FIG. 83

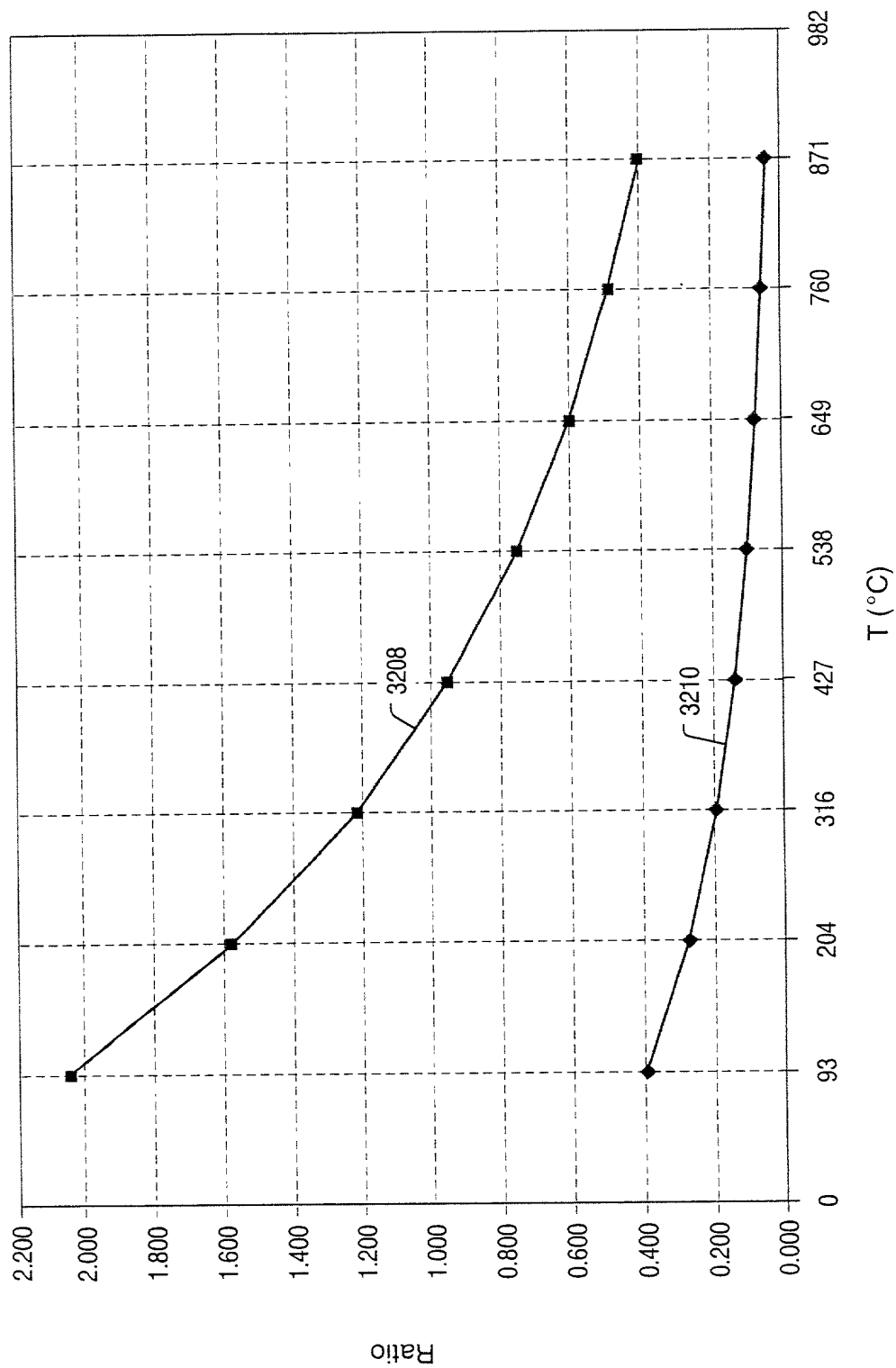


FIG. 84

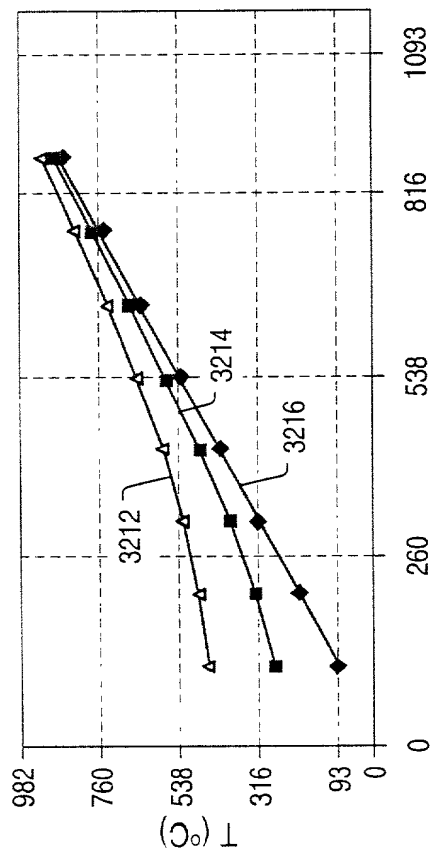


FIG. 85

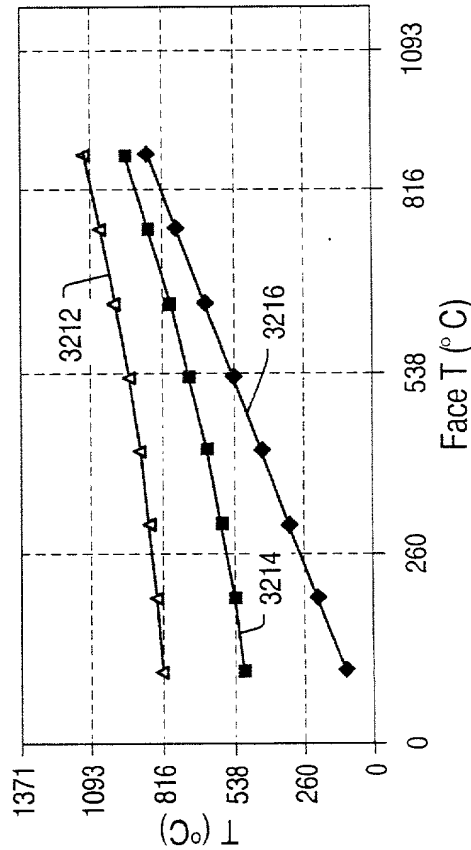
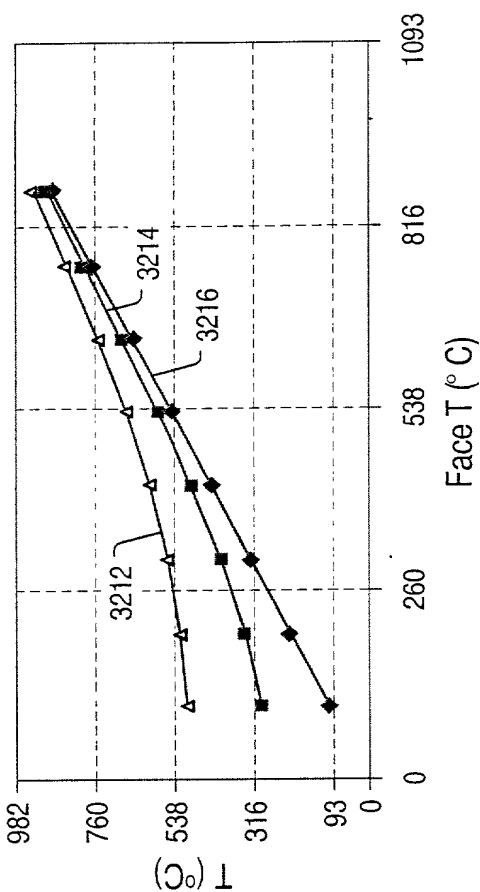


FIG. 87

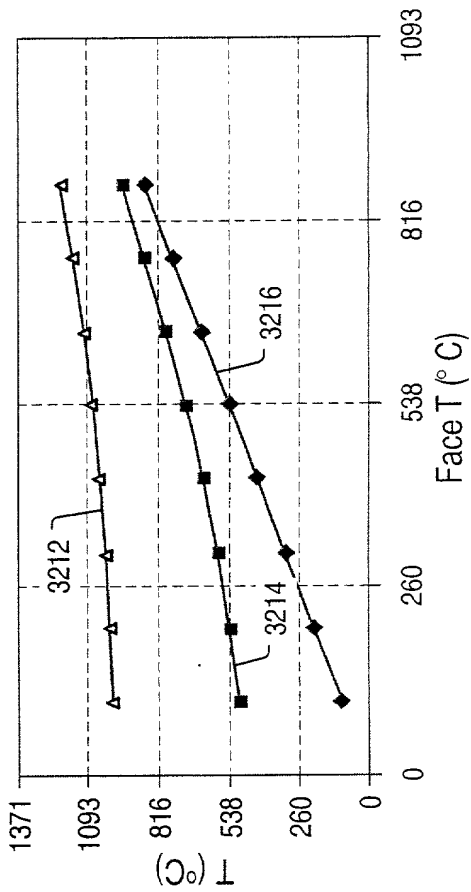


FIG. 88

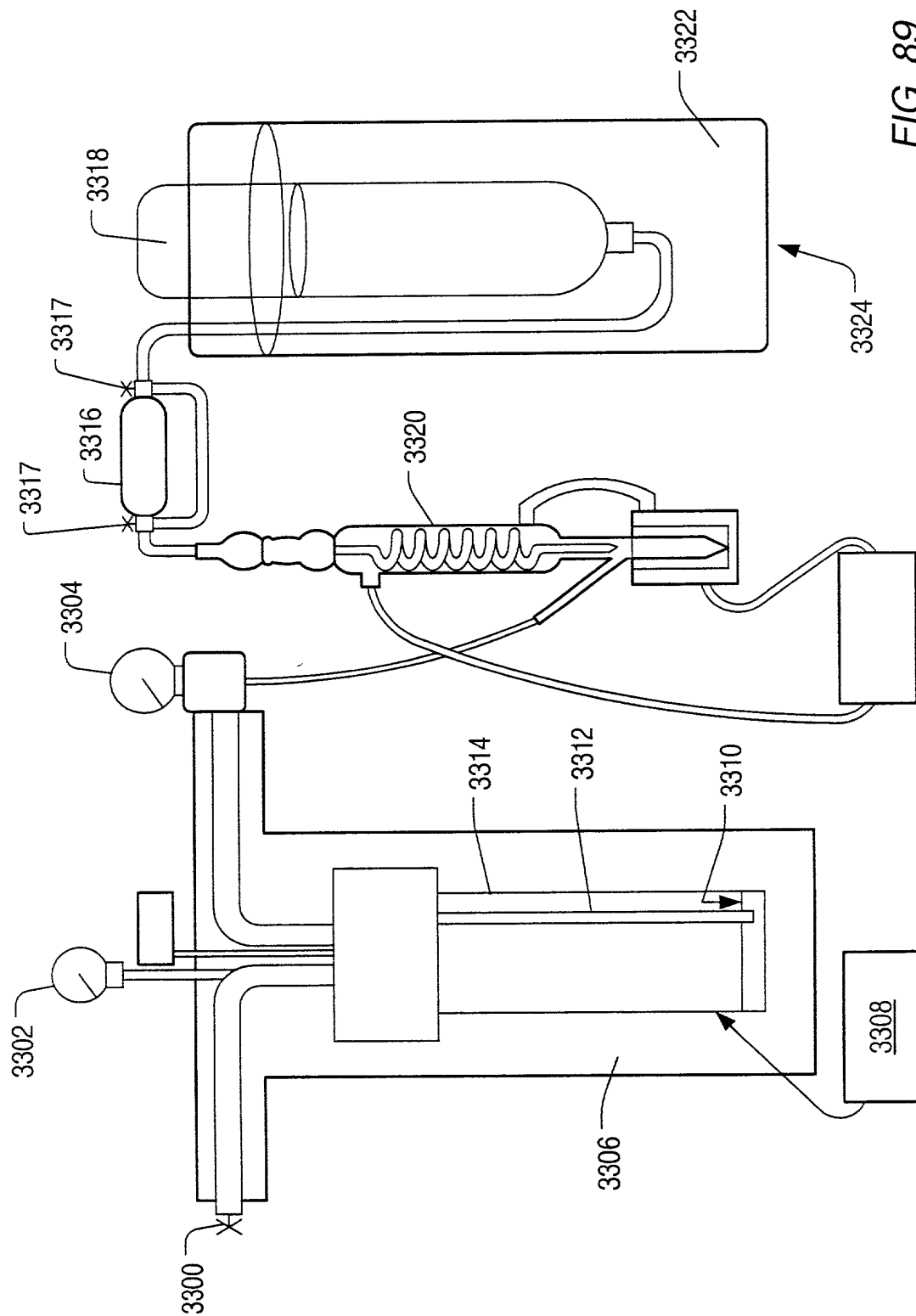


FIG. 89

Figure 90 shows the variation of the pressure (P) in bar with temperature (T) in °C for a mixture of 1% to 25% of a component. The curves show that the pressure increases with temperature for all compositions. The pressure values range from 0 to 27.58 bar, and the temperature values range from 300 to 400 °C.

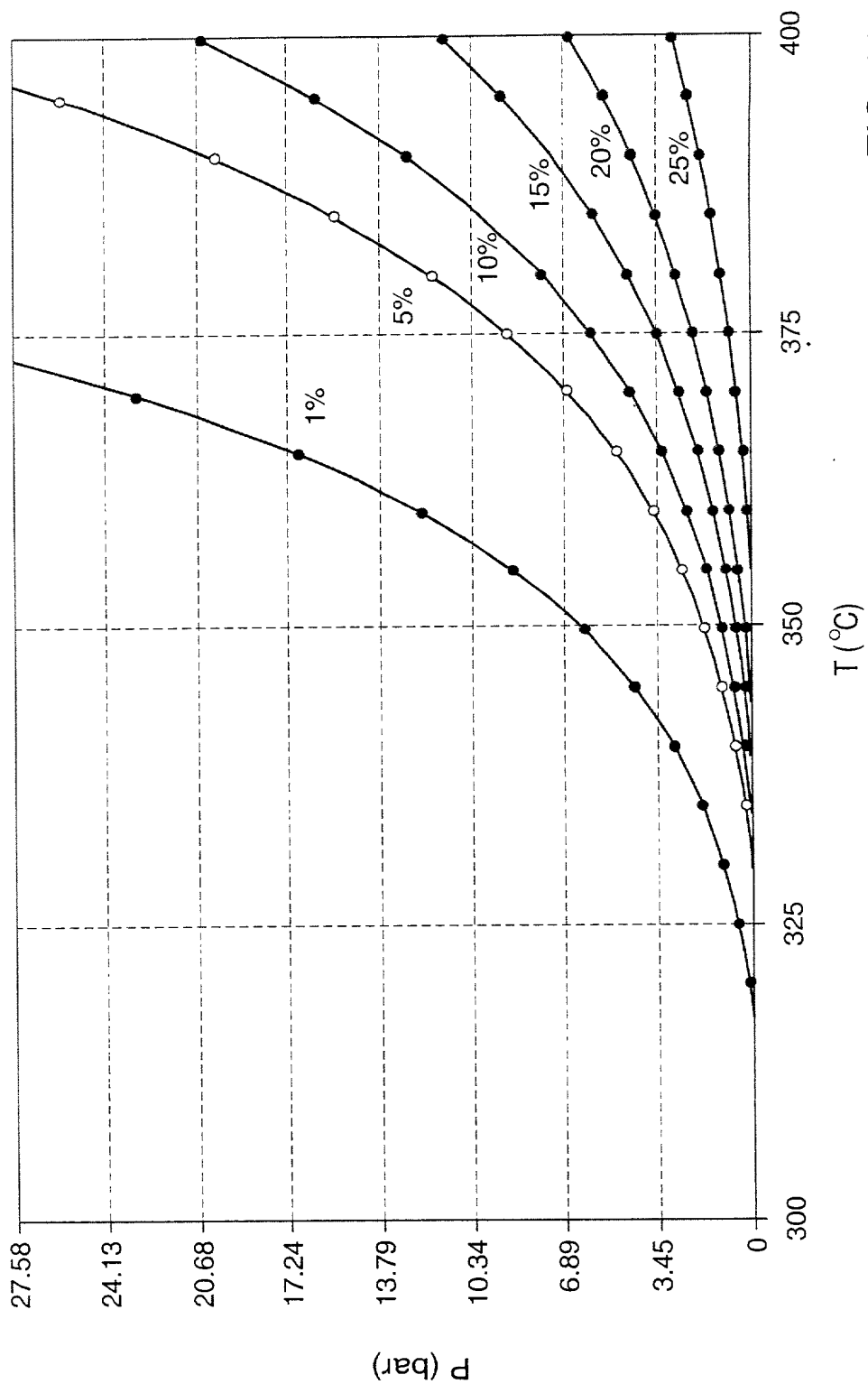


FIG. 90

0.01 0.05 0.1

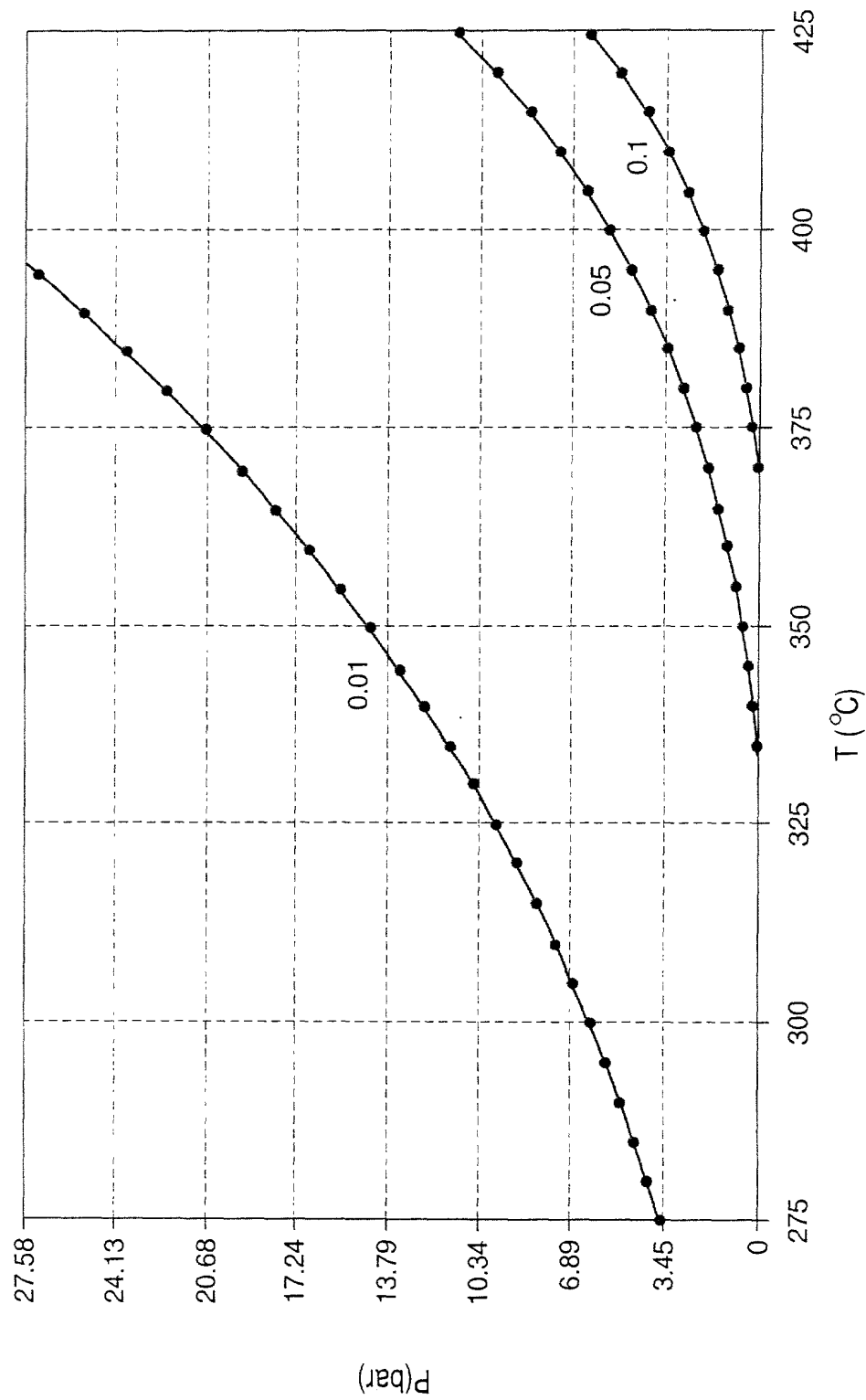


FIG. 92

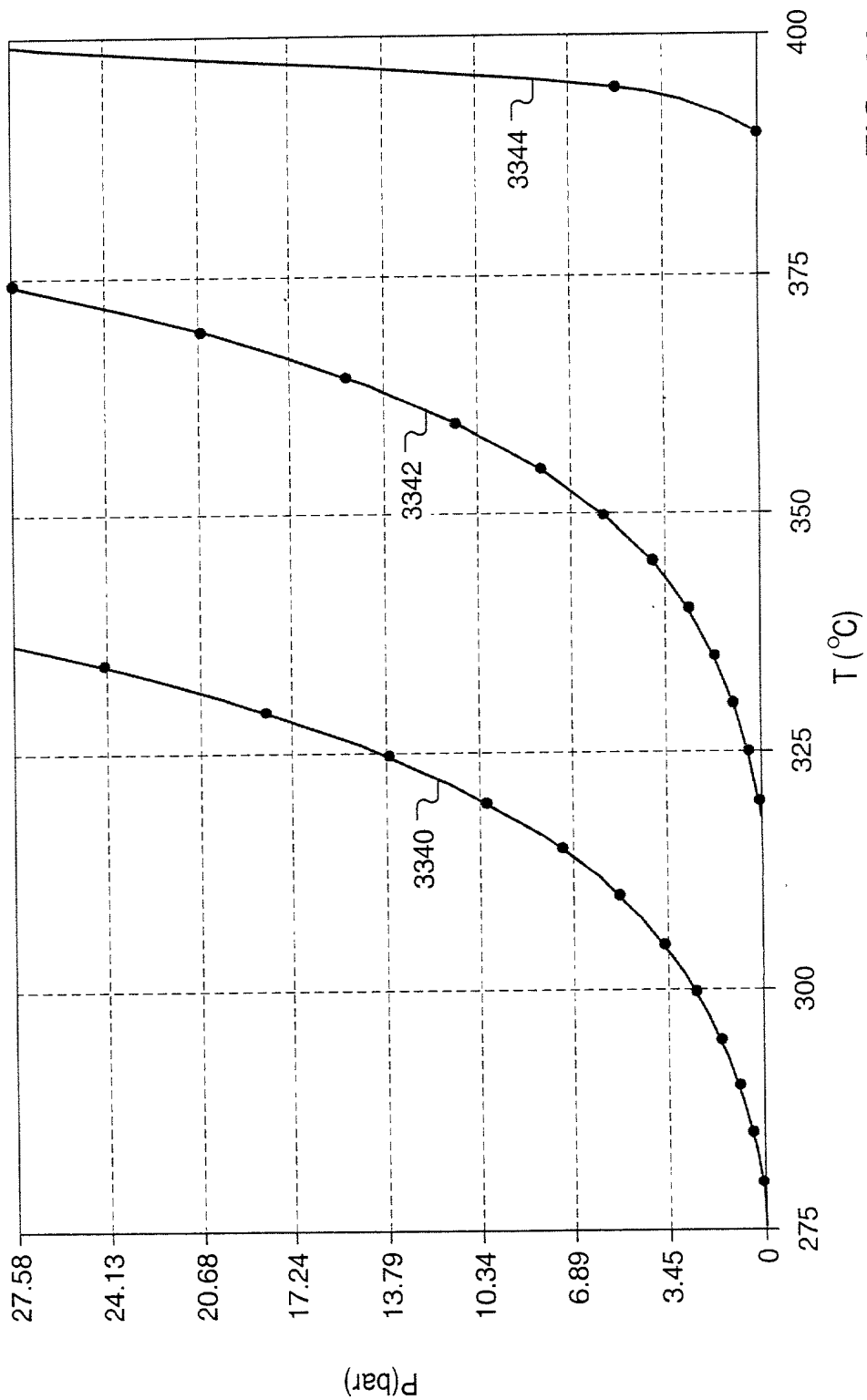


FIG. 93

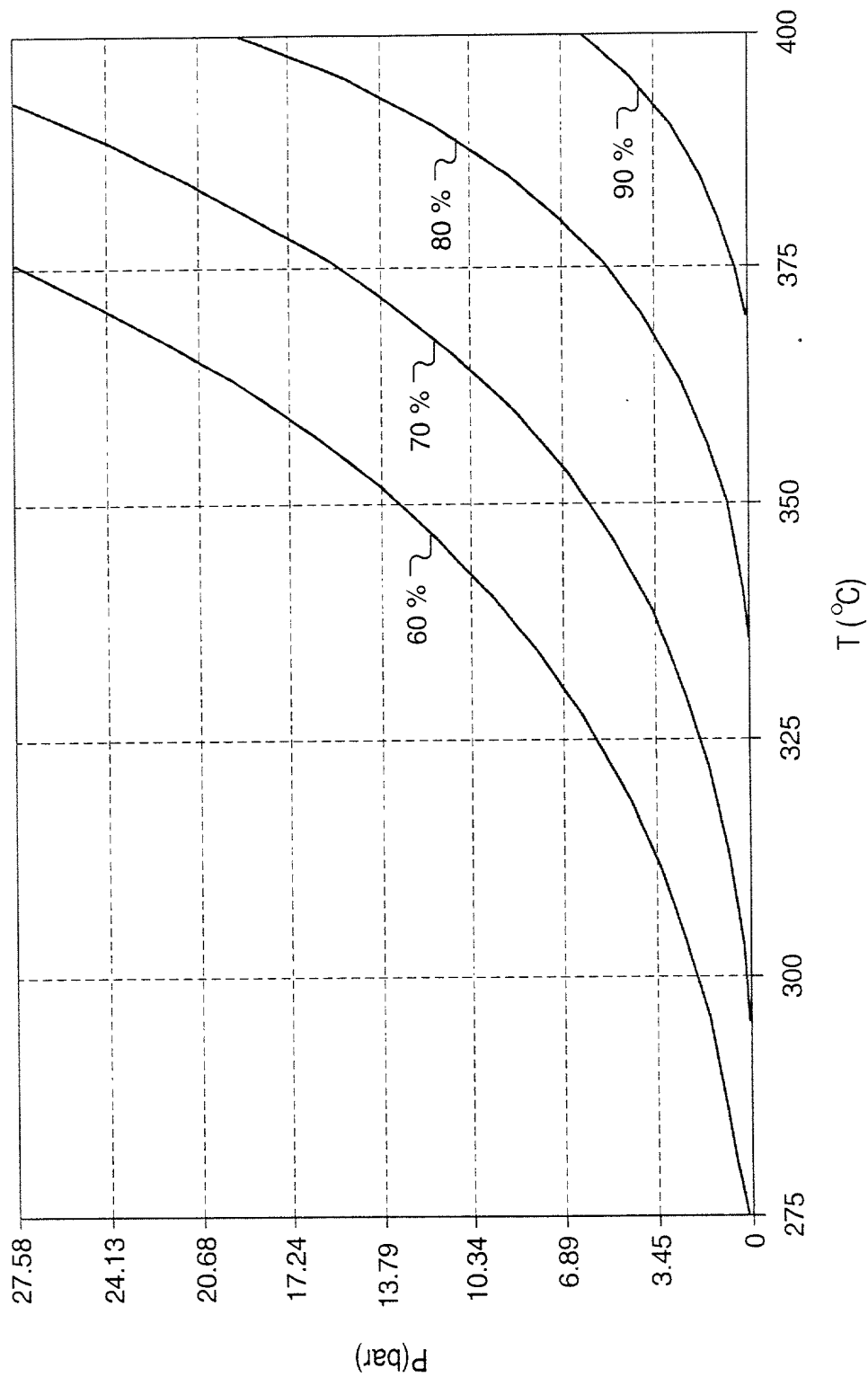


FIG. 95

FIG. 96 is a graph showing the relationship between pressure (P) in bar and temperature (T) in degrees Celsius for three different values of a parameter, 1.8, 1.9, and 1.99. The curves show that as the parameter value increases, the pressure required to maintain a given temperature also increases. The graph includes a grid with major lines every 25 units on the temperature axis and every 3.45 units on the pressure axis.

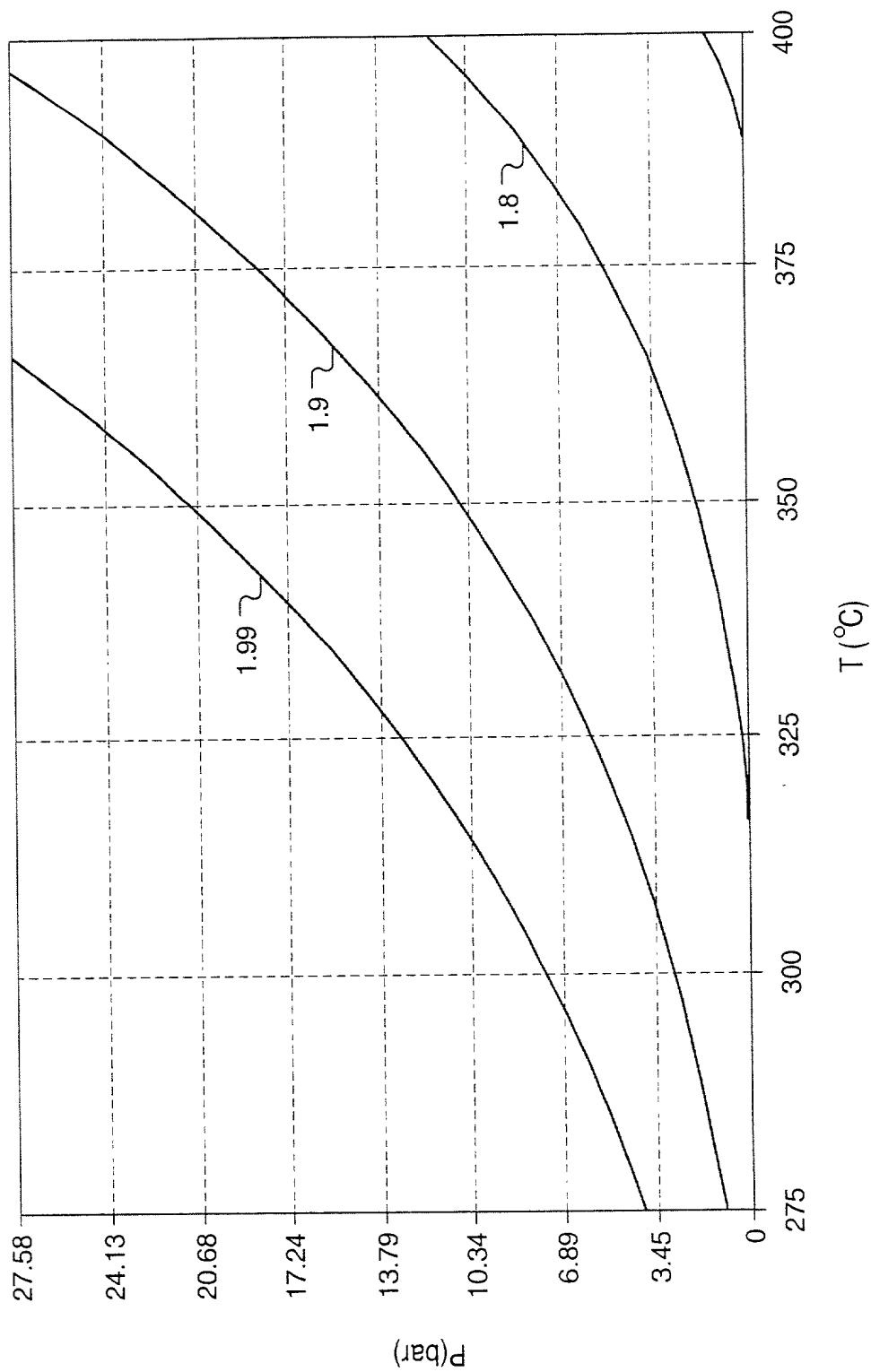


FIG. 96

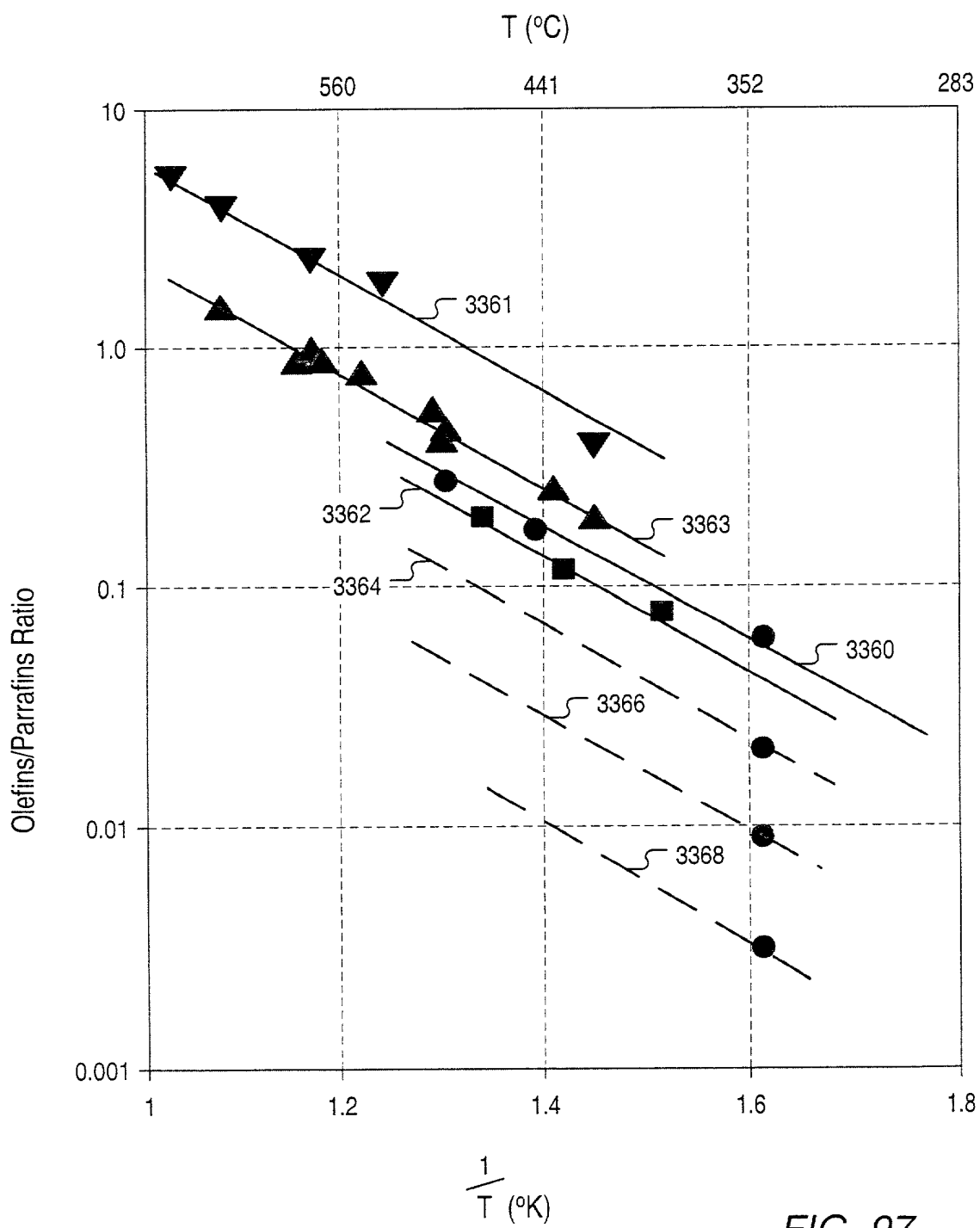


FIG. 97

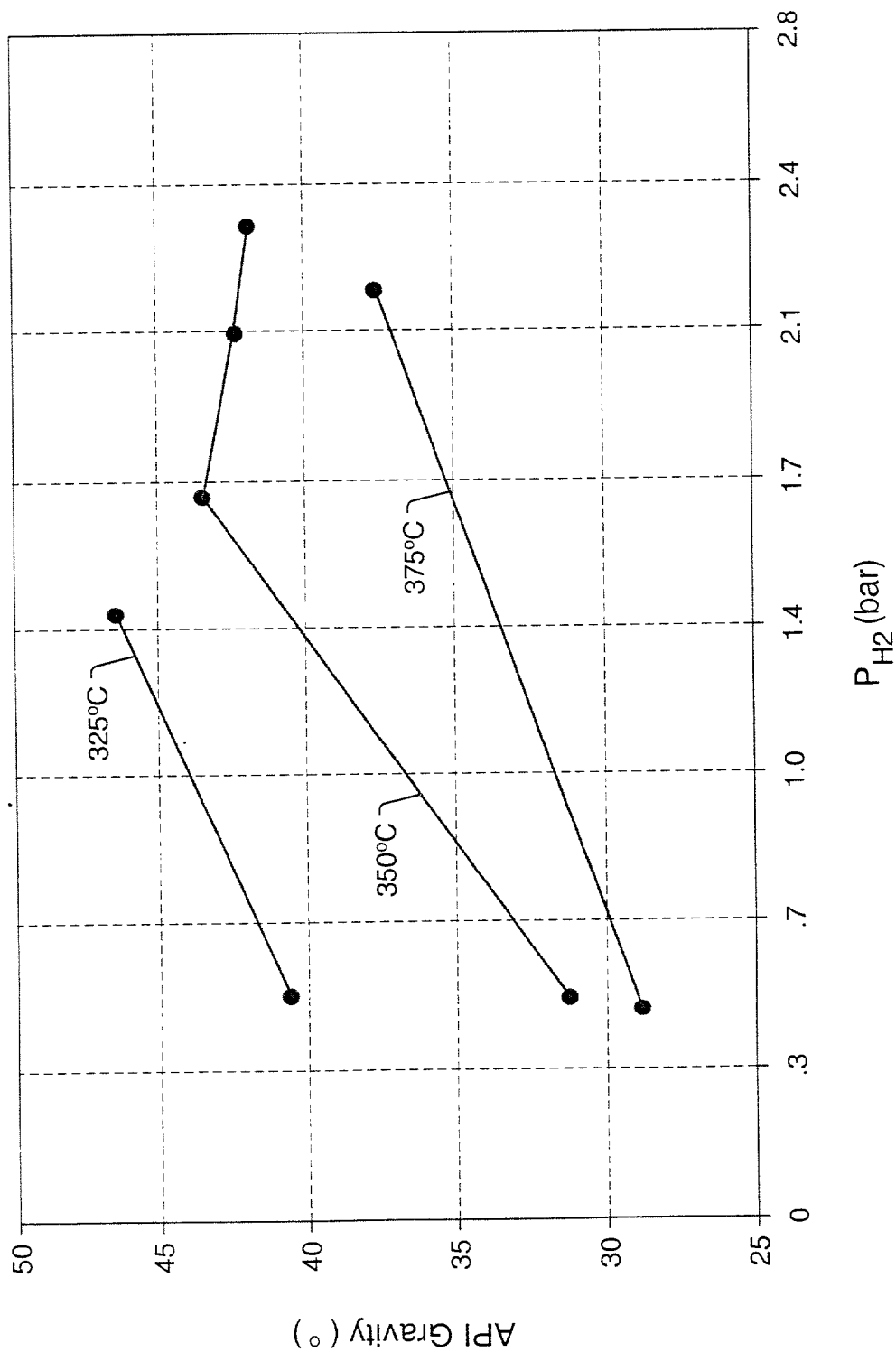


FIG. 98

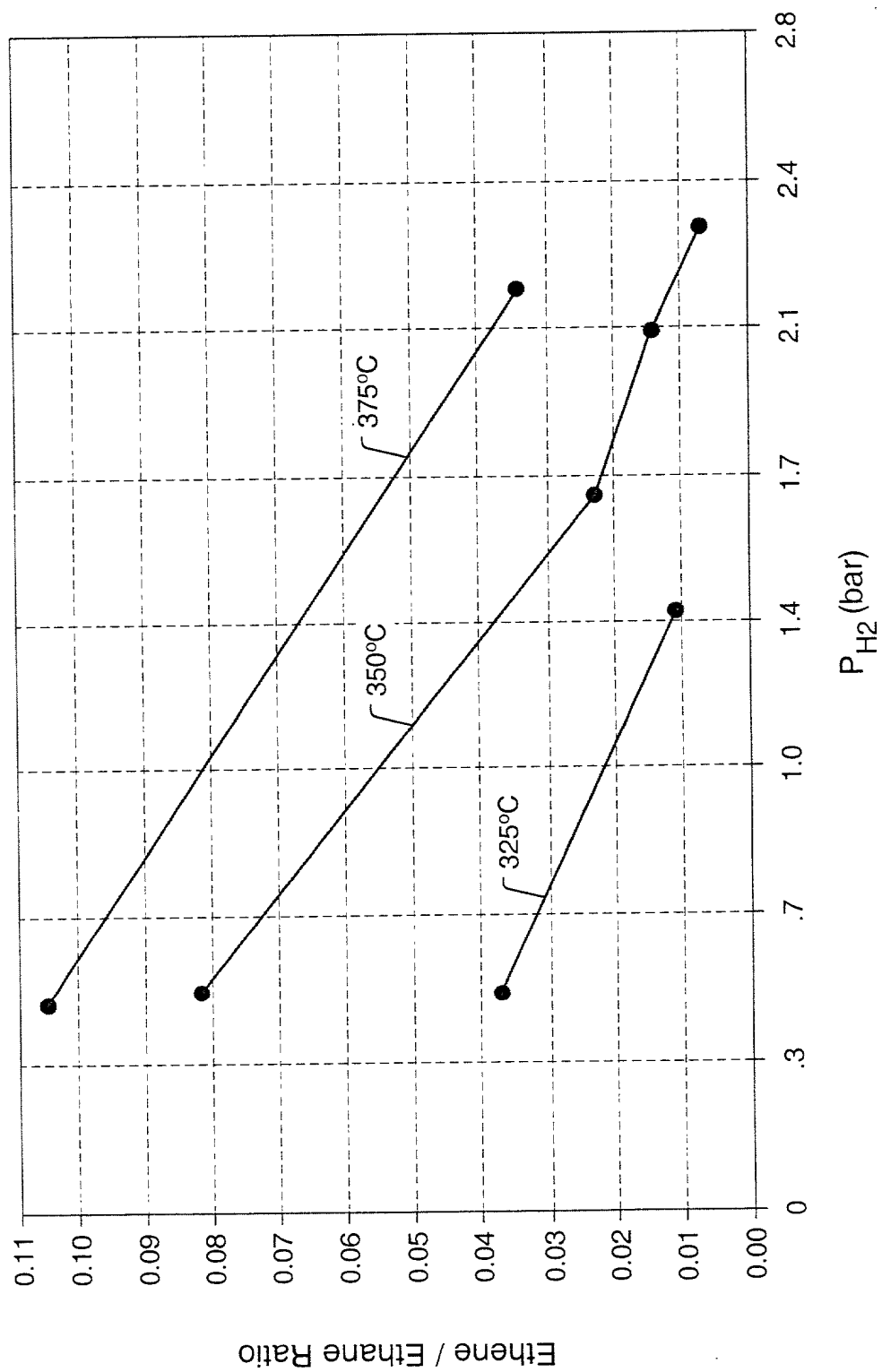


FIG. 100

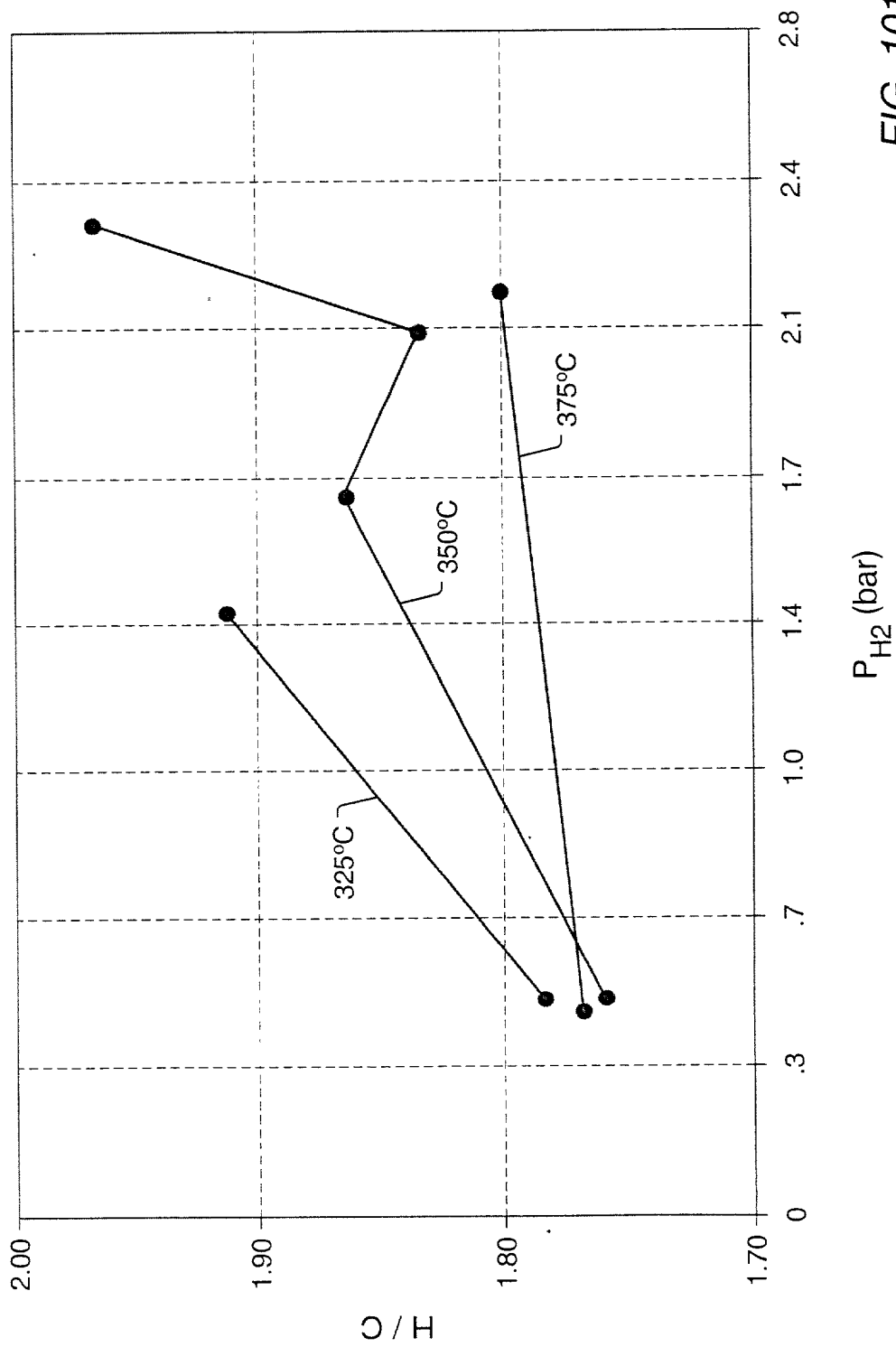


FIG. 101

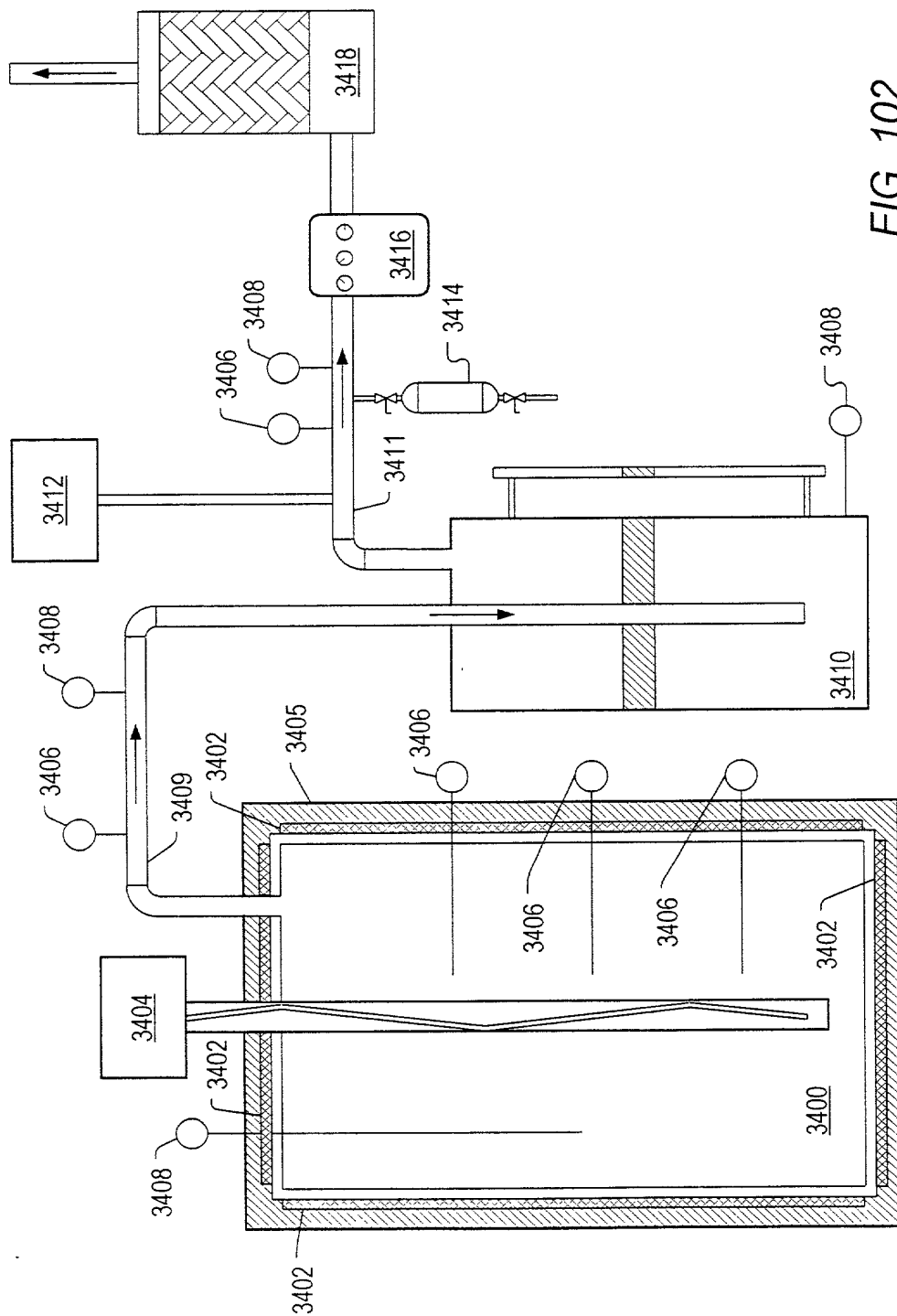


FIG. 102

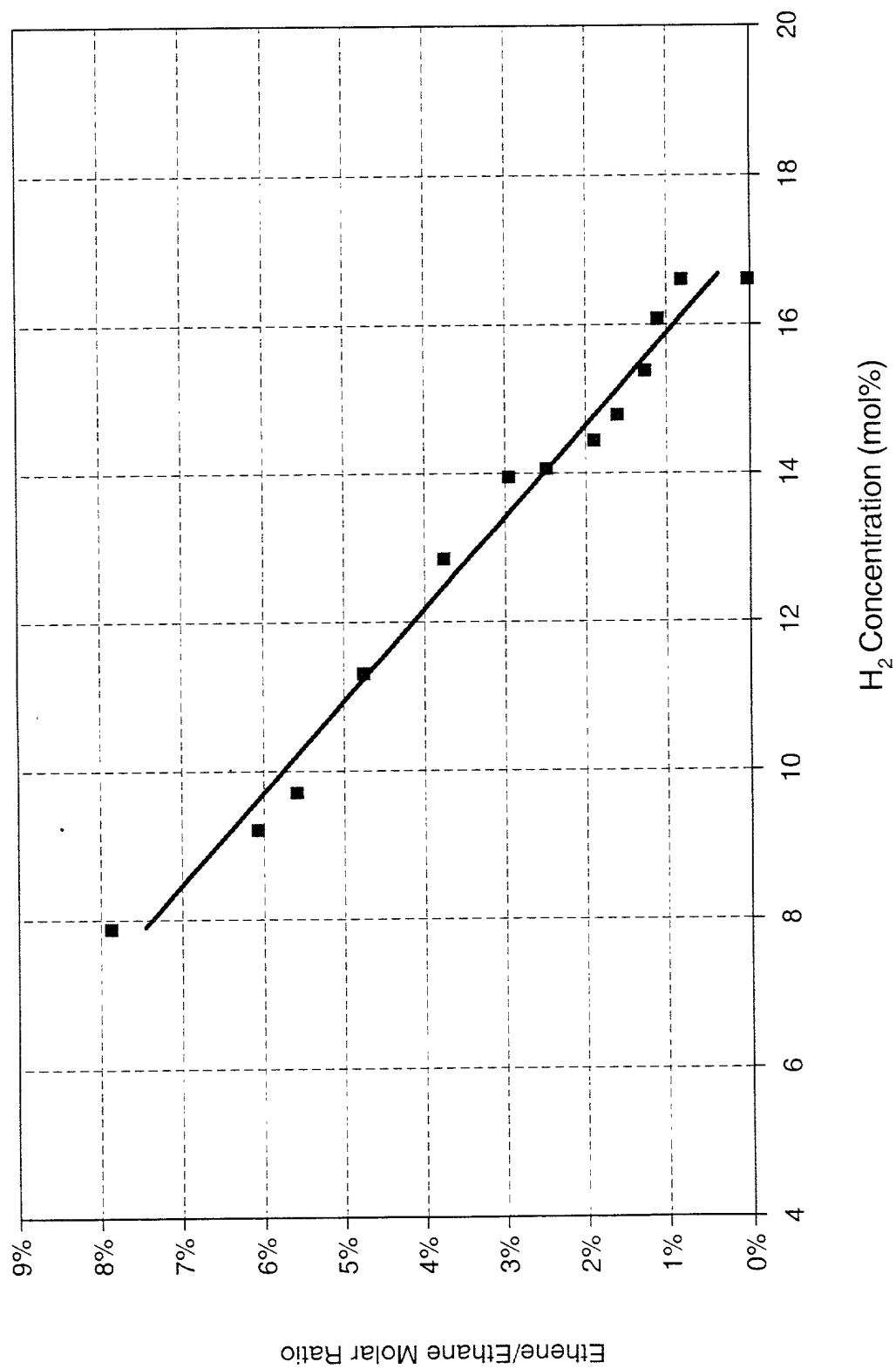


FIG. 103

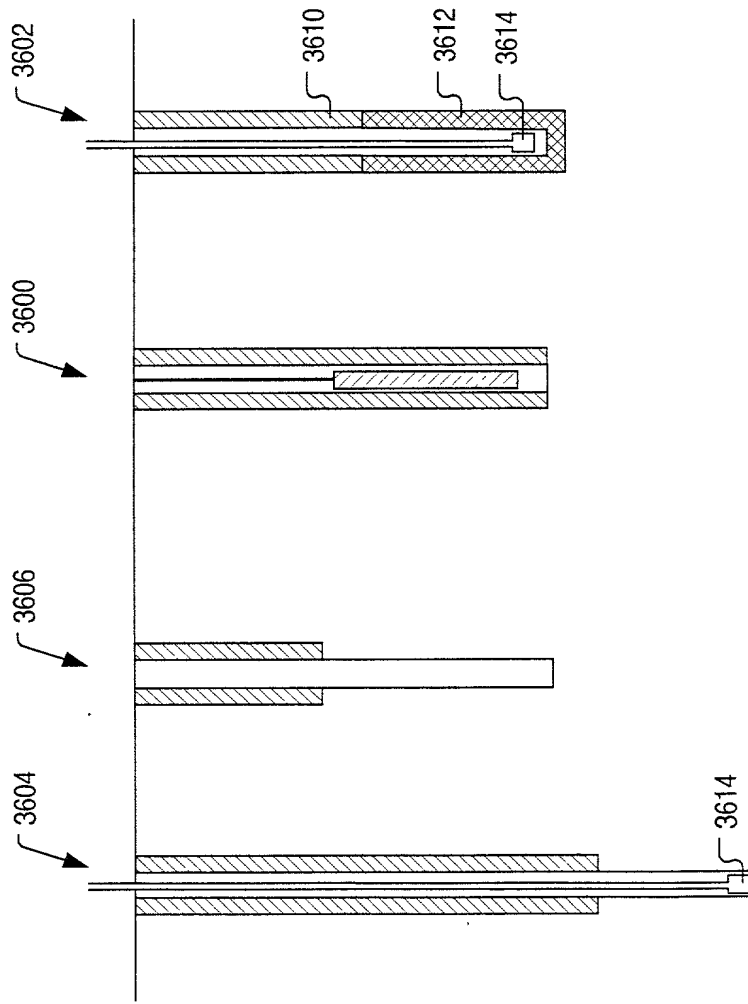


FIG. 105

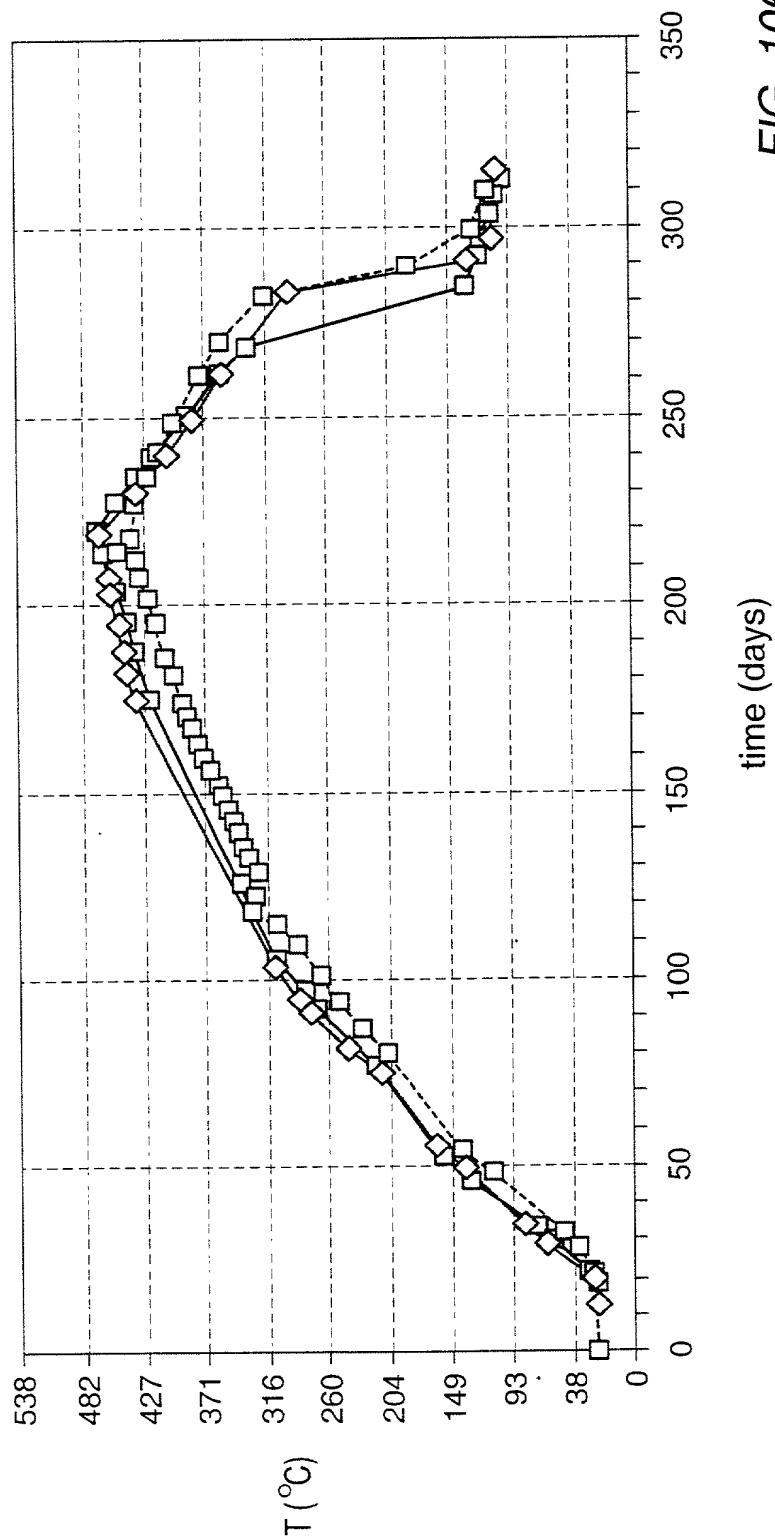


FIG. 106

FIG. 107

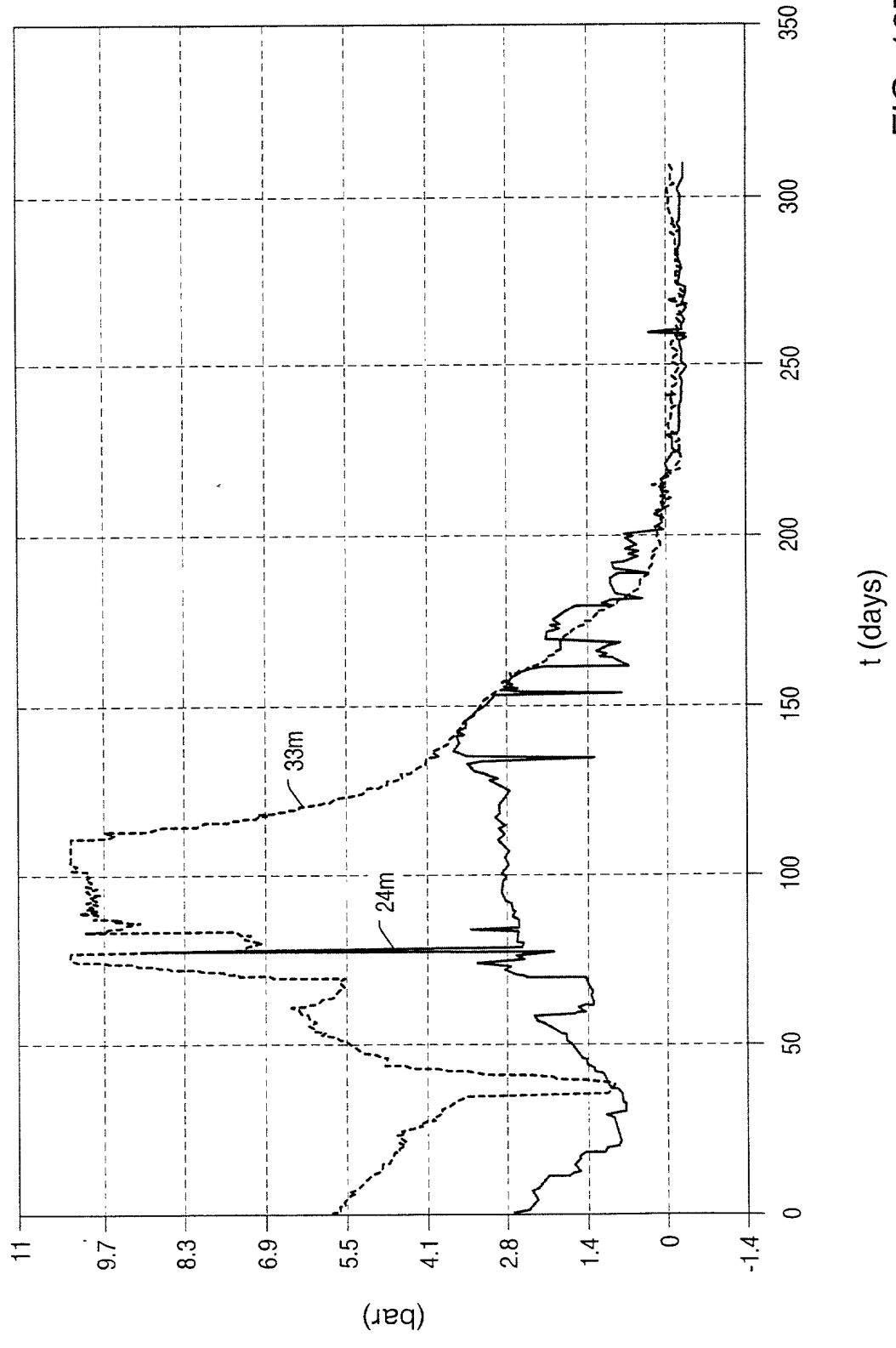


FIG. 107

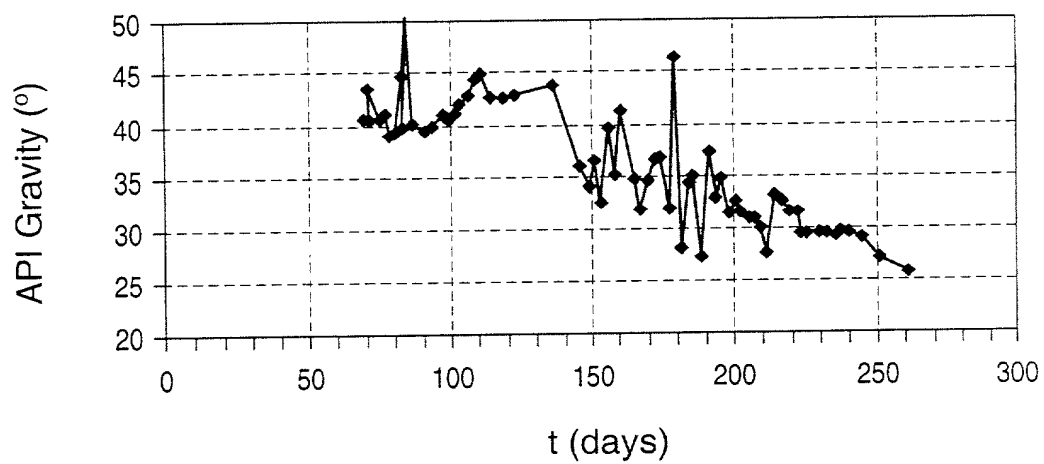


FIG. 108

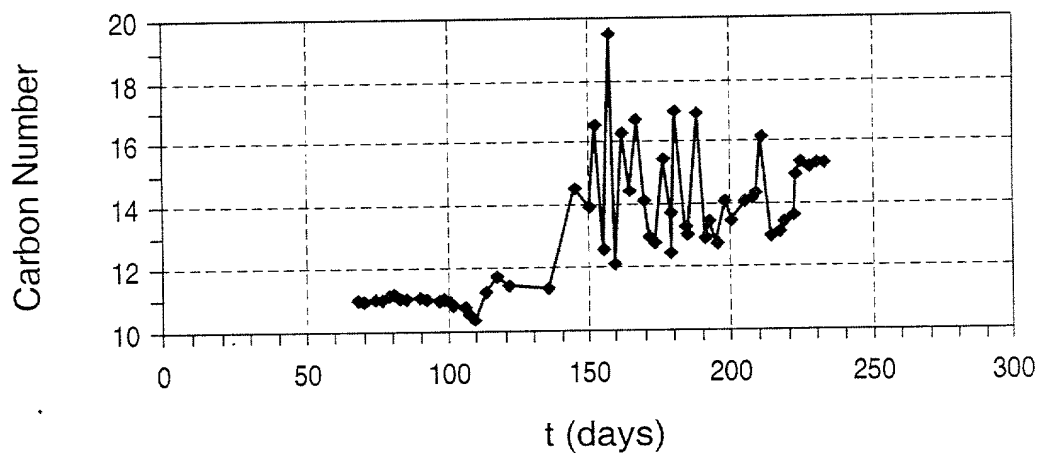


FIG. 109

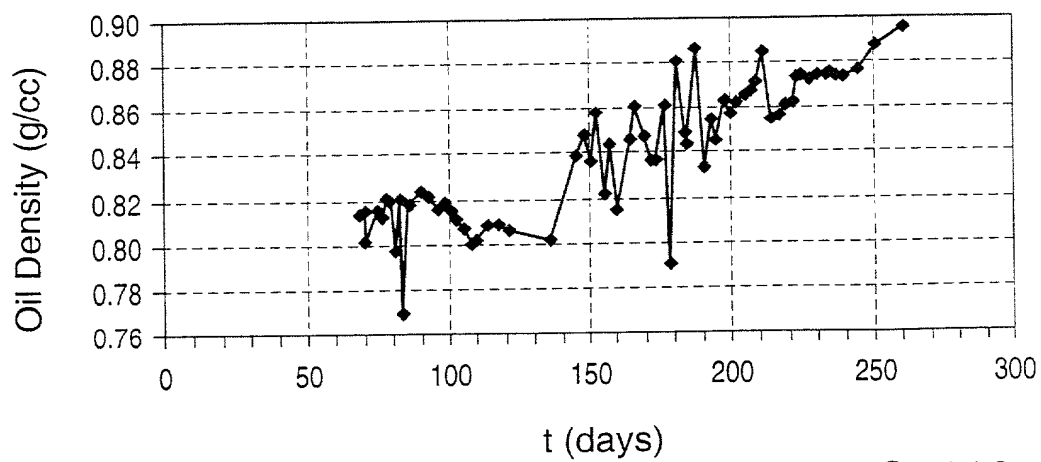


FIG. 110

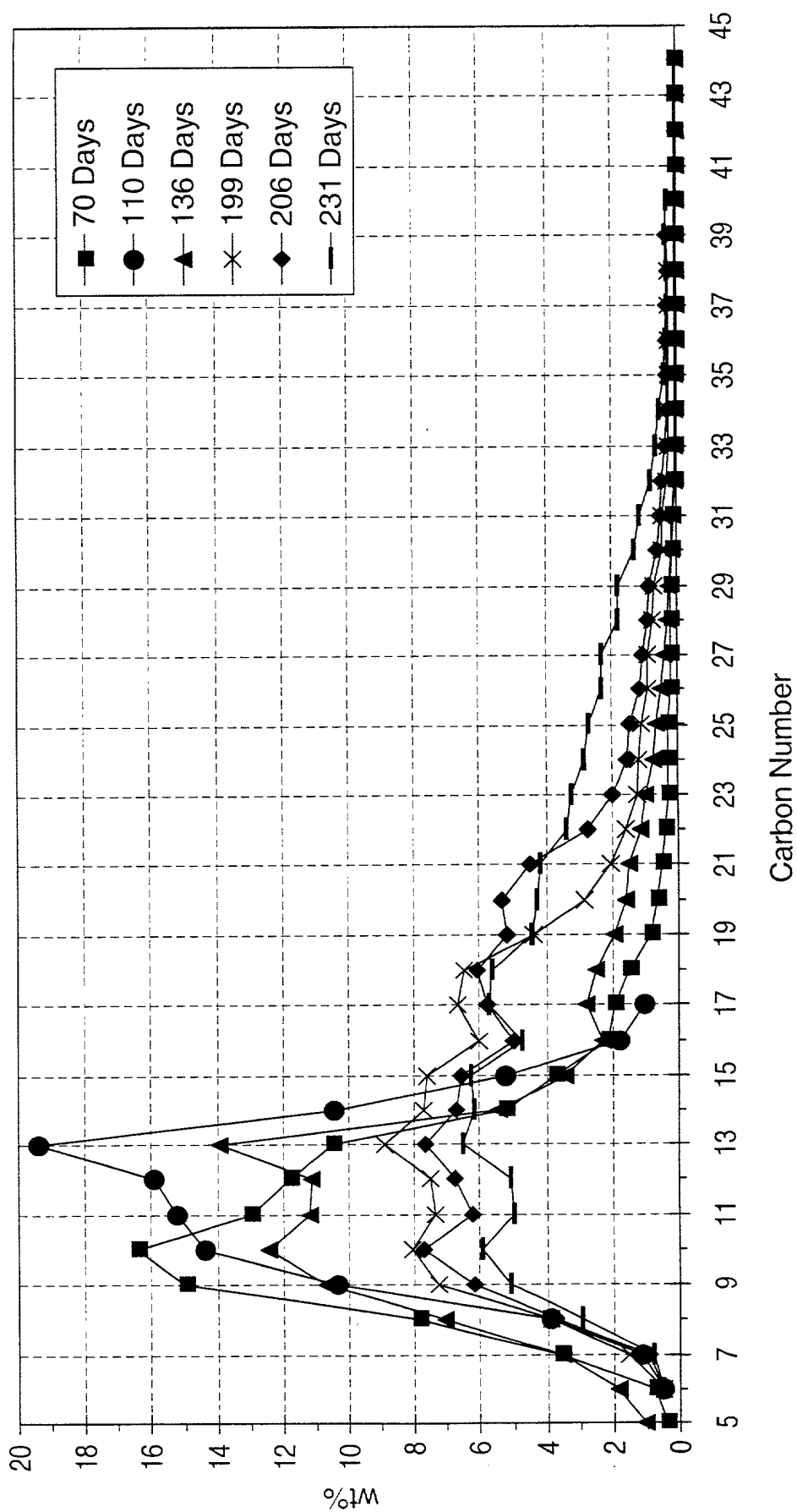


FIG. 111

100 95 90 85 80 75 70

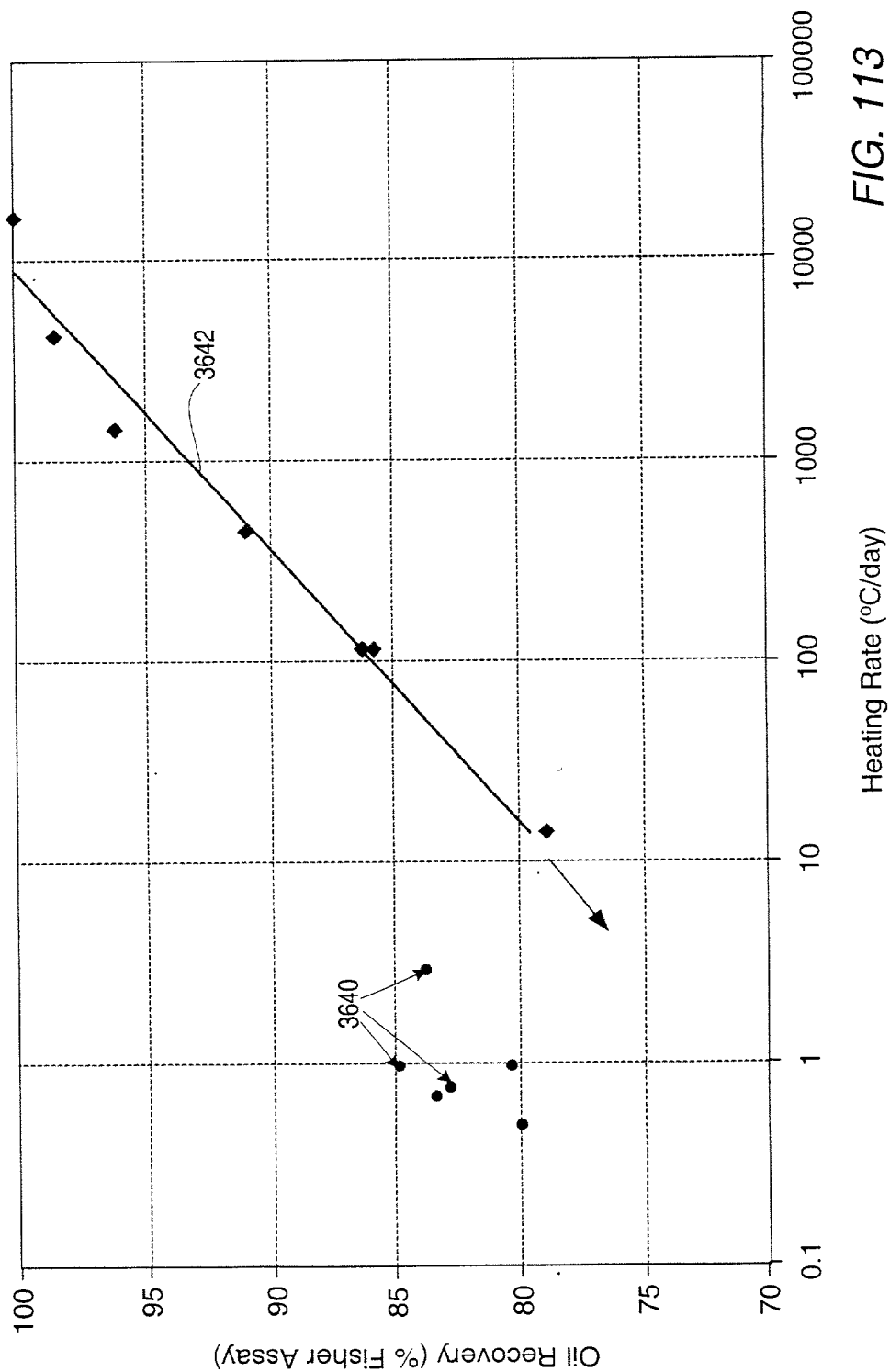


FIG. 113

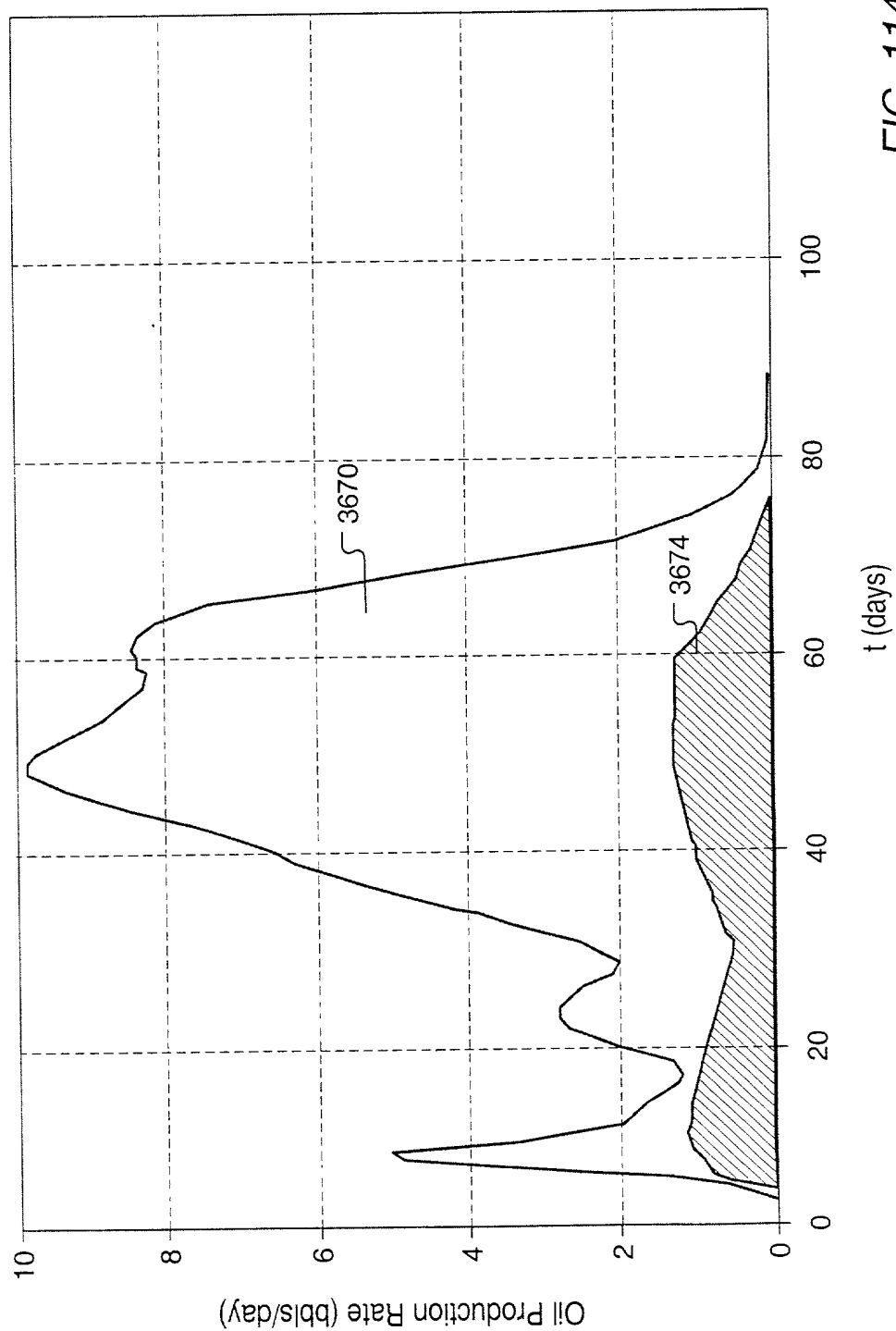


FIG. 114

Vitrinite Reflectance (%)	Wt %
0.32	20
0.35	21
0.38	30
0.42	35
0.45	37
0.55	43
0.62	57
1.25	54

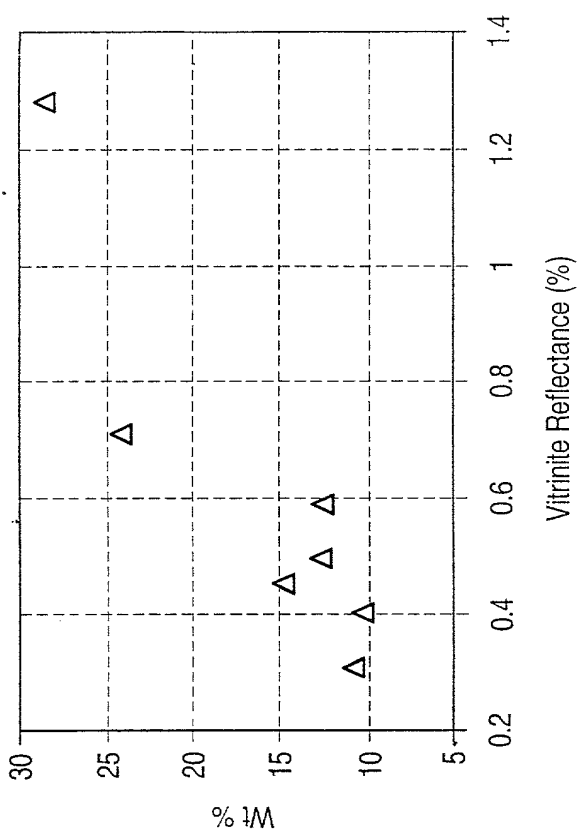


FIG. 116

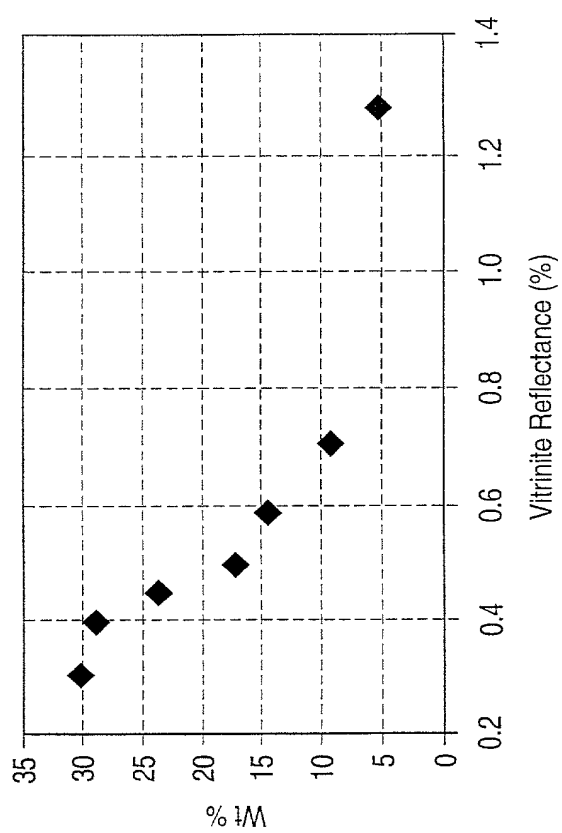


FIG. 118

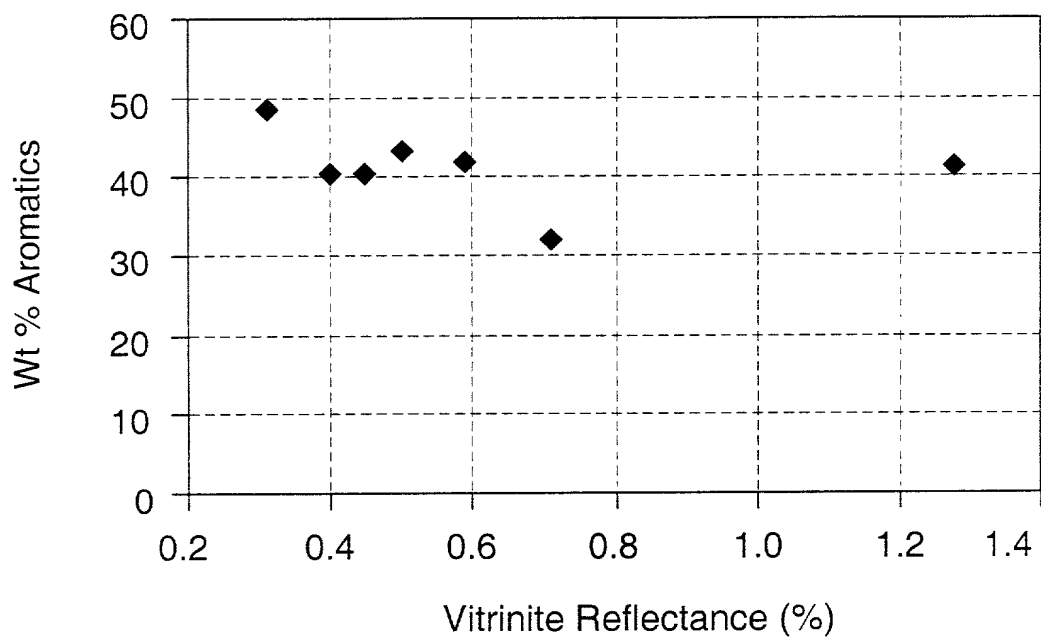


FIG. 119

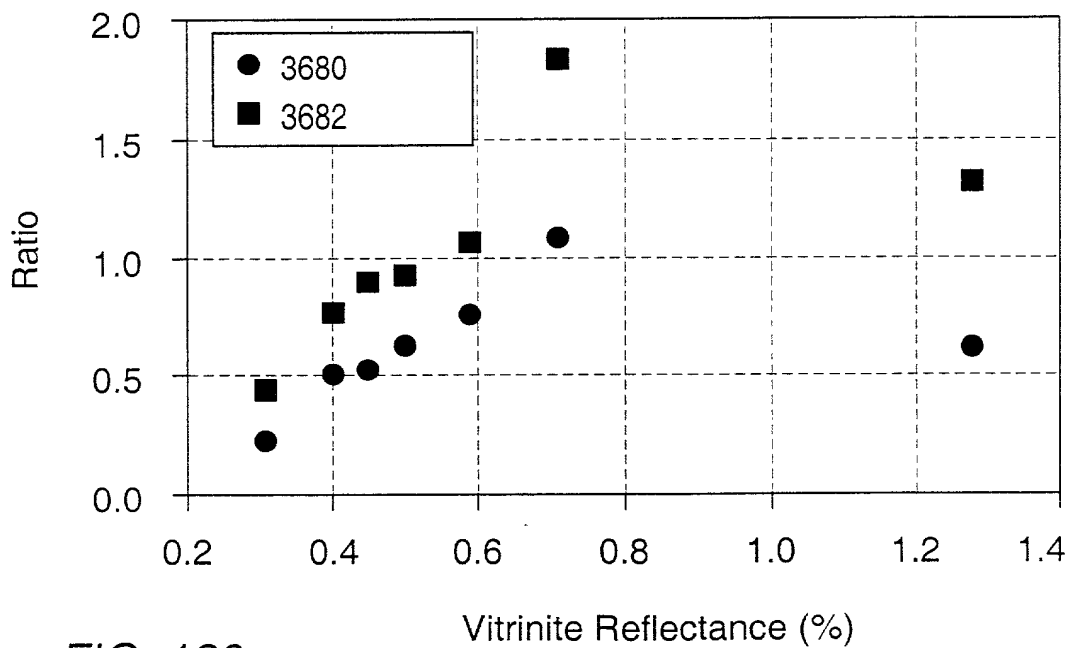


FIG. 120

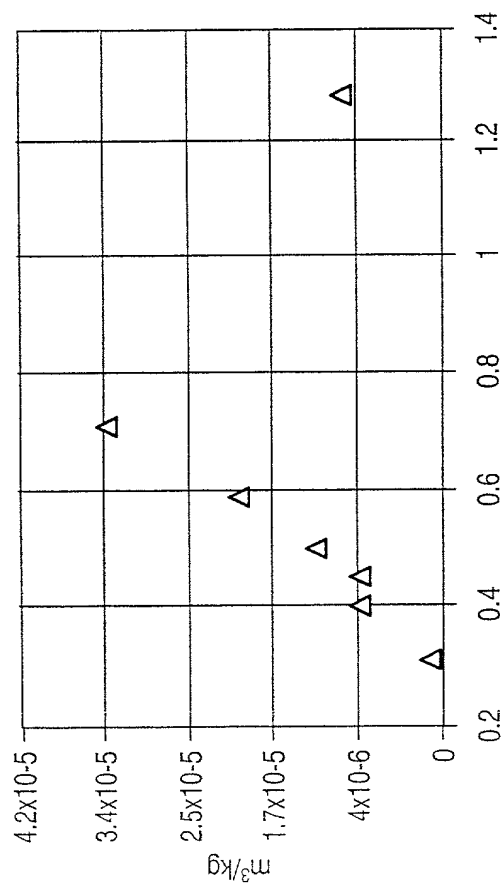


FIG. 121

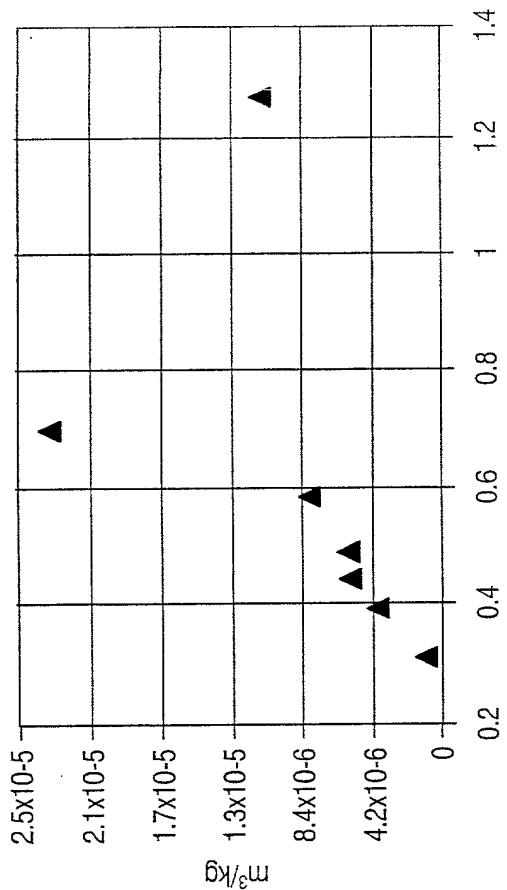


FIG. 122

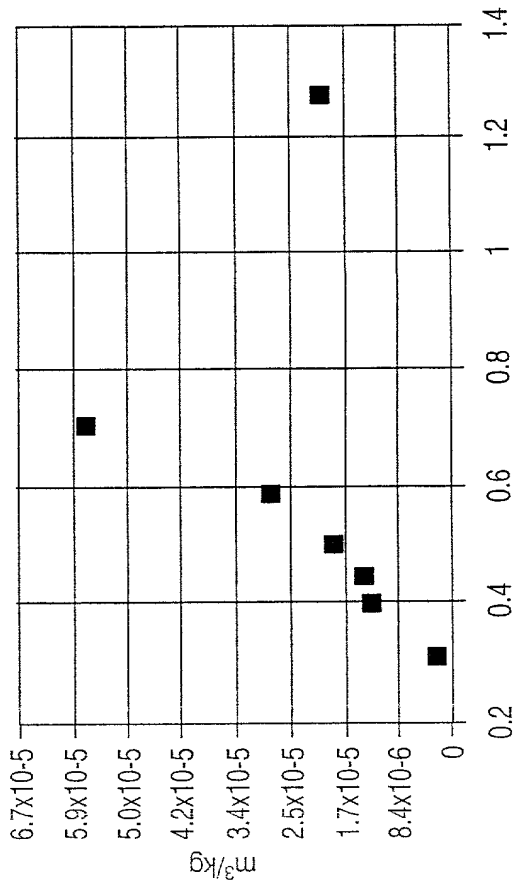


FIG. 123

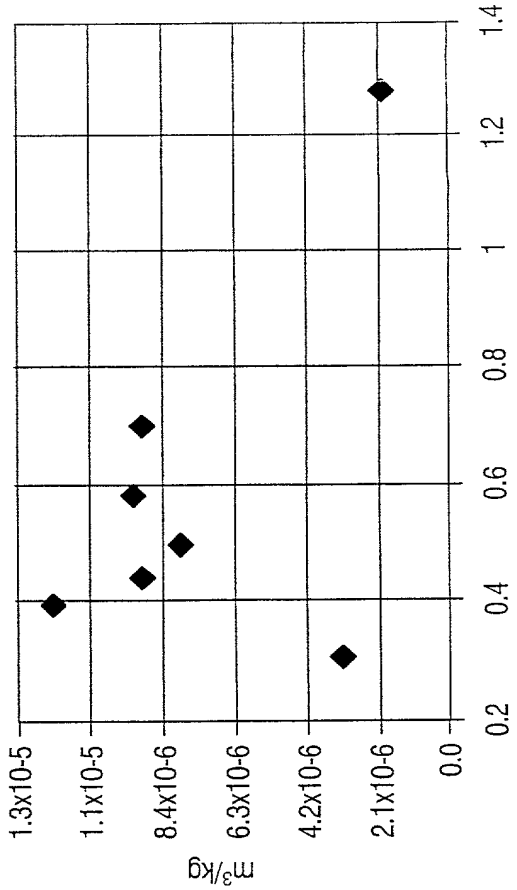


FIG. 124

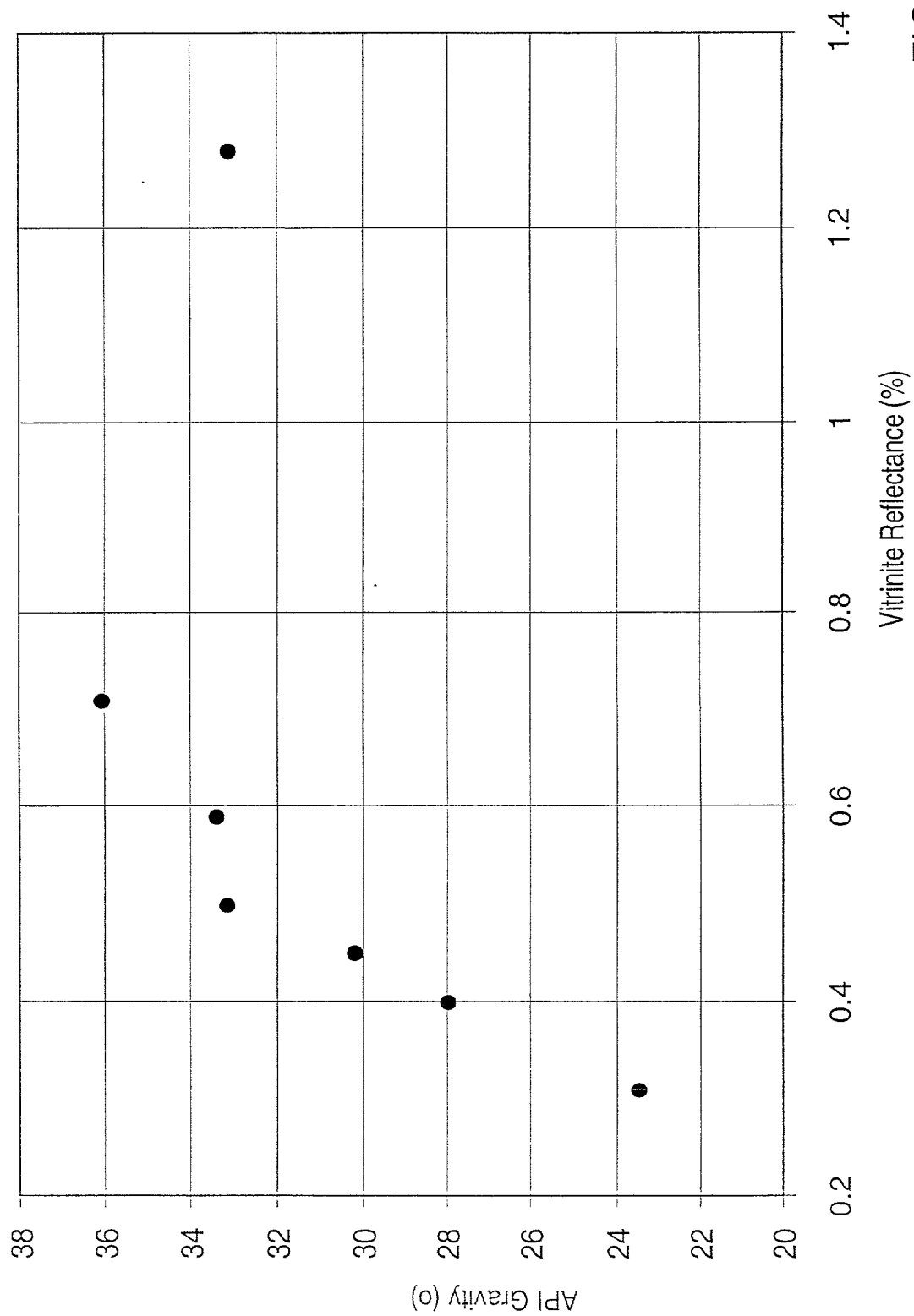
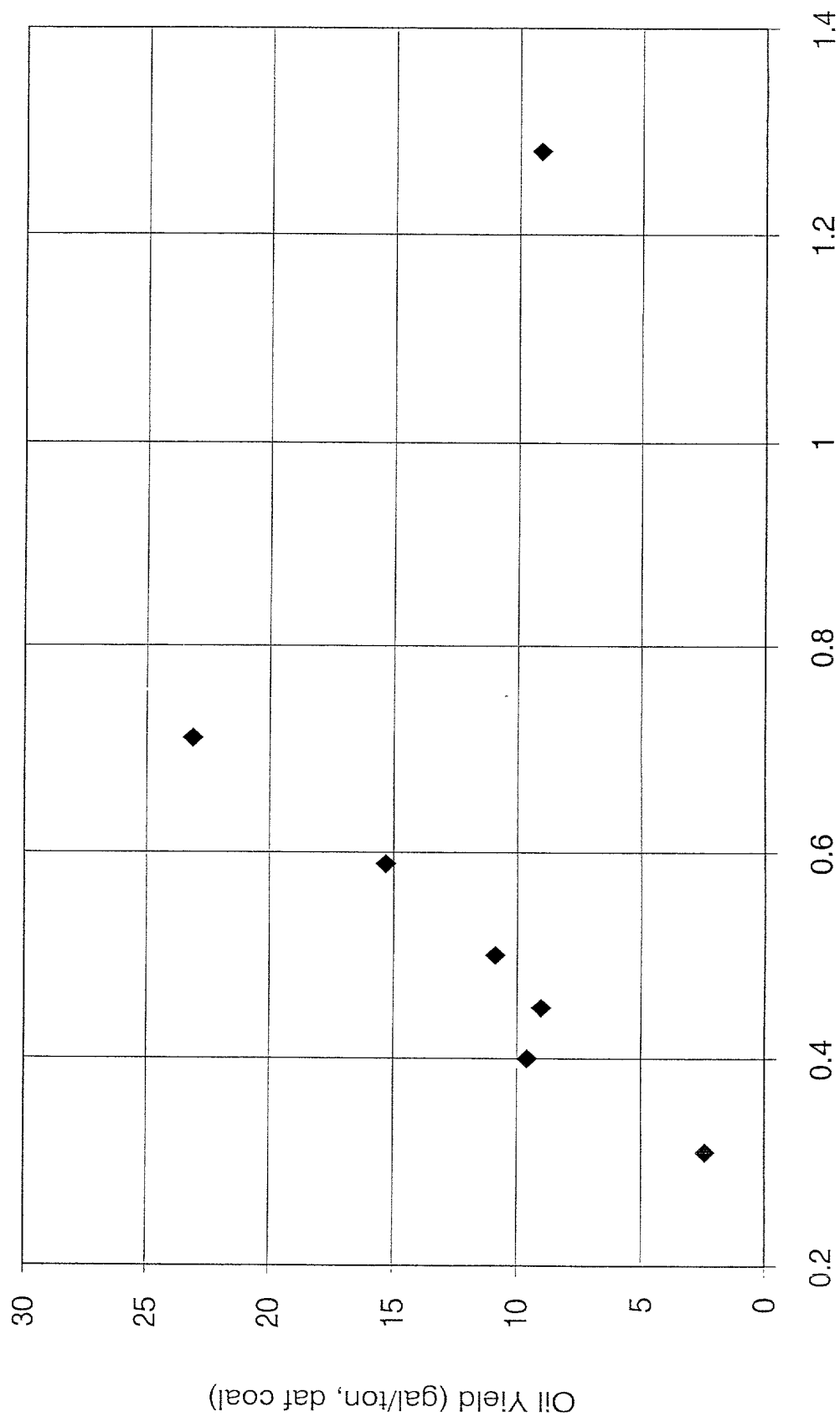


FIG. 125

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Vitrinite Reflectance (%)

FIG. 126

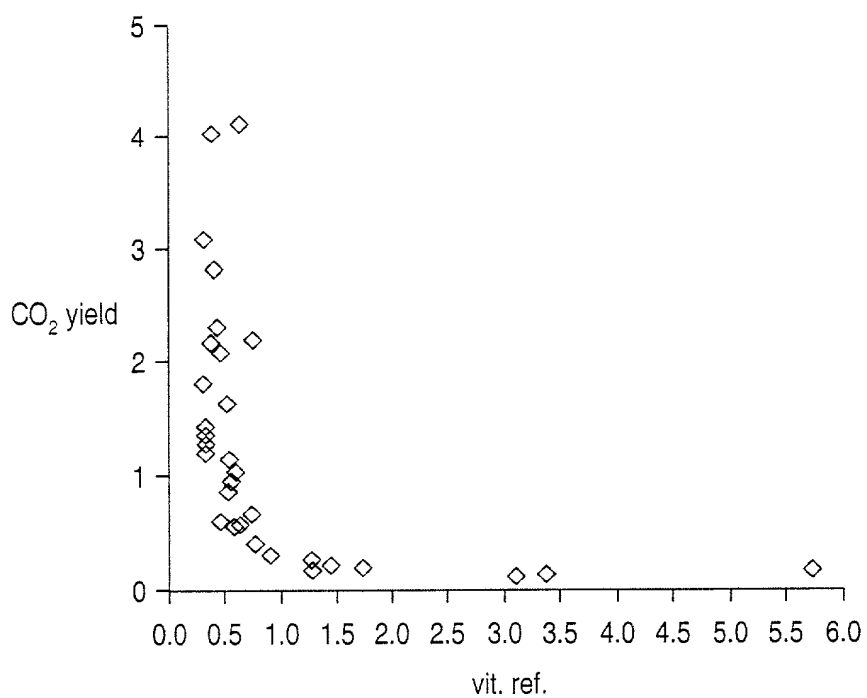


FIG. 127

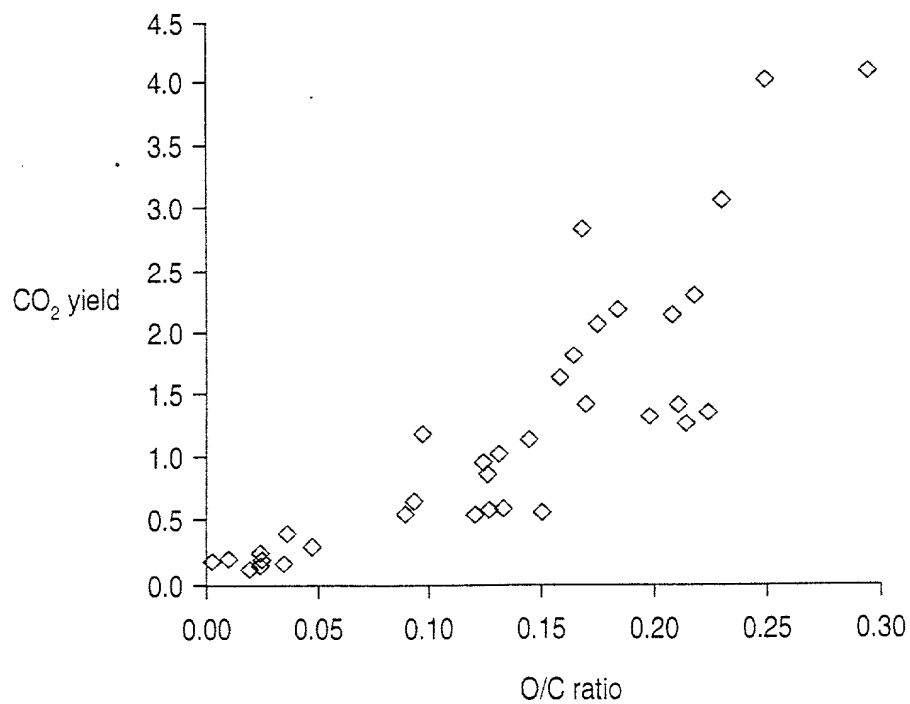


FIG. 128

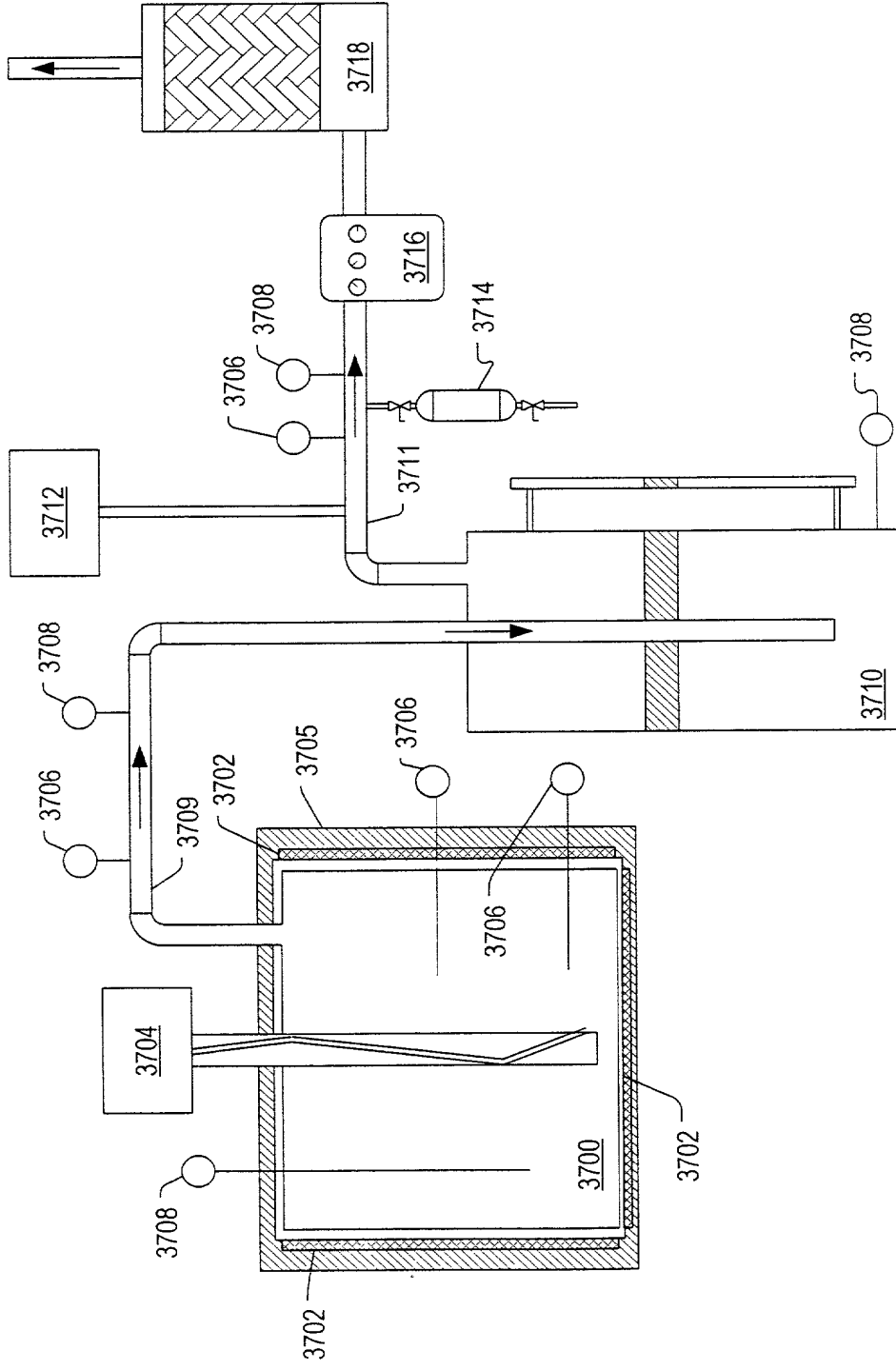


FIG. 129

FIG. 130

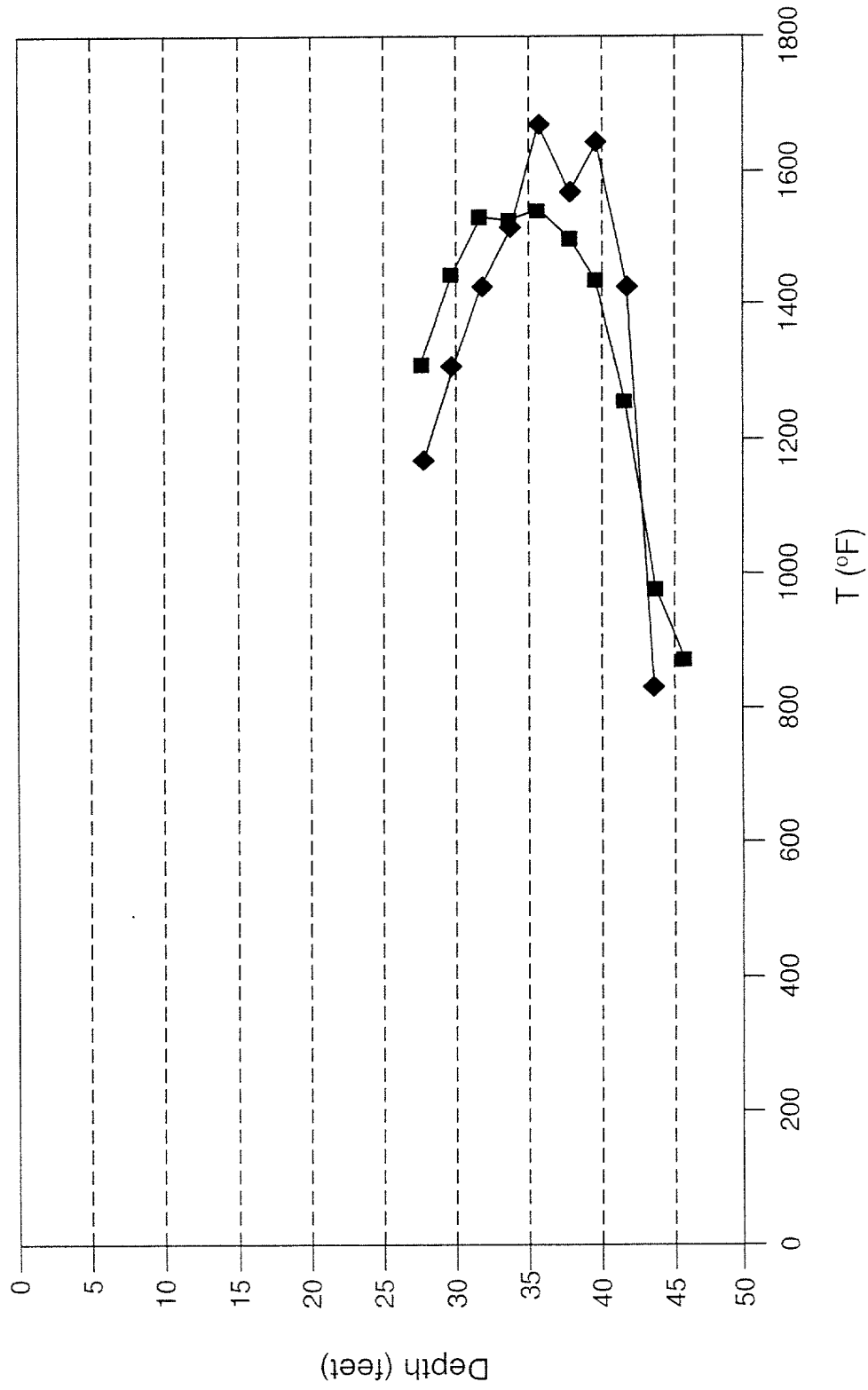


FIG. 130

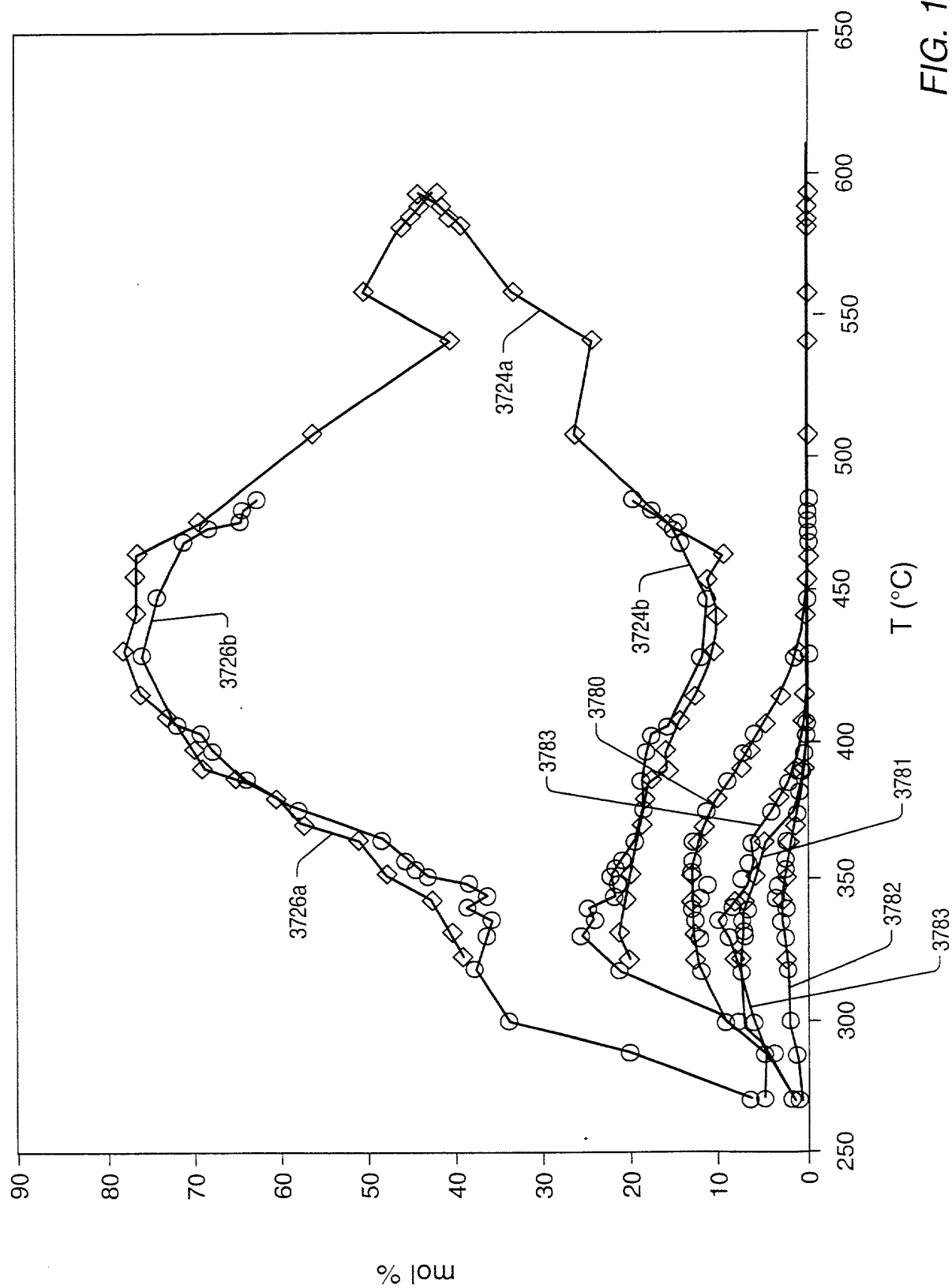


FIG. 131

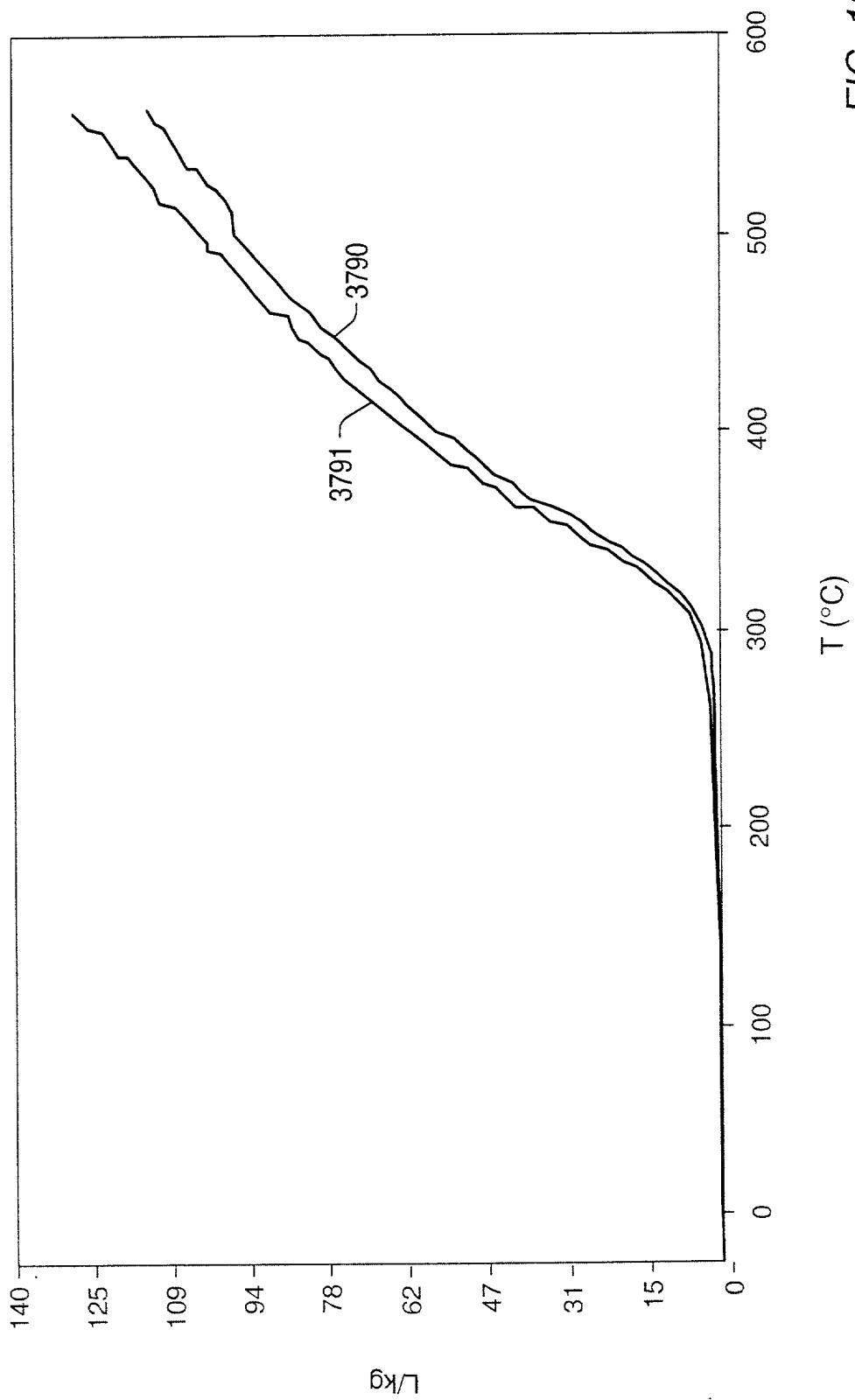


FIG. 132

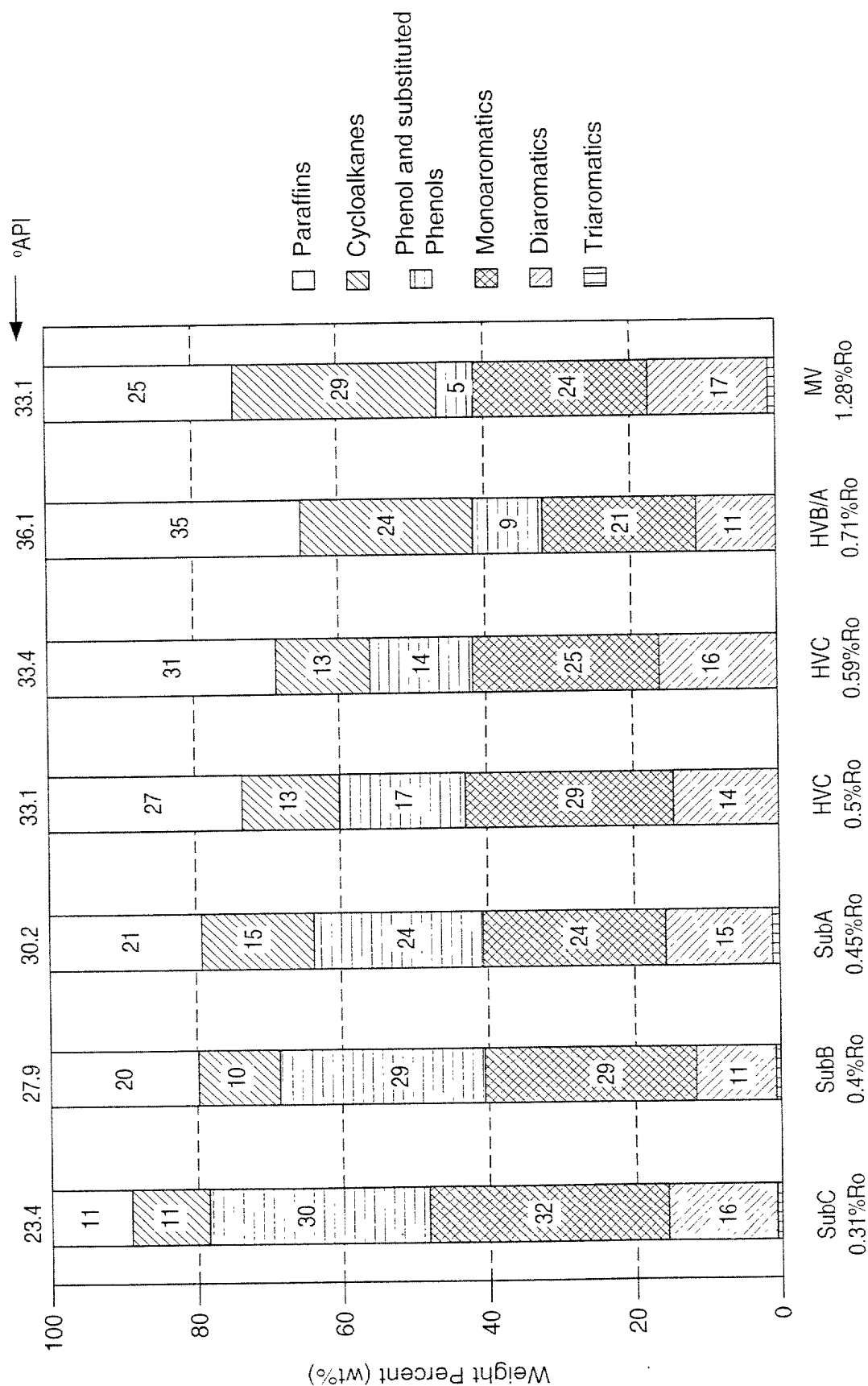


FIG. 134

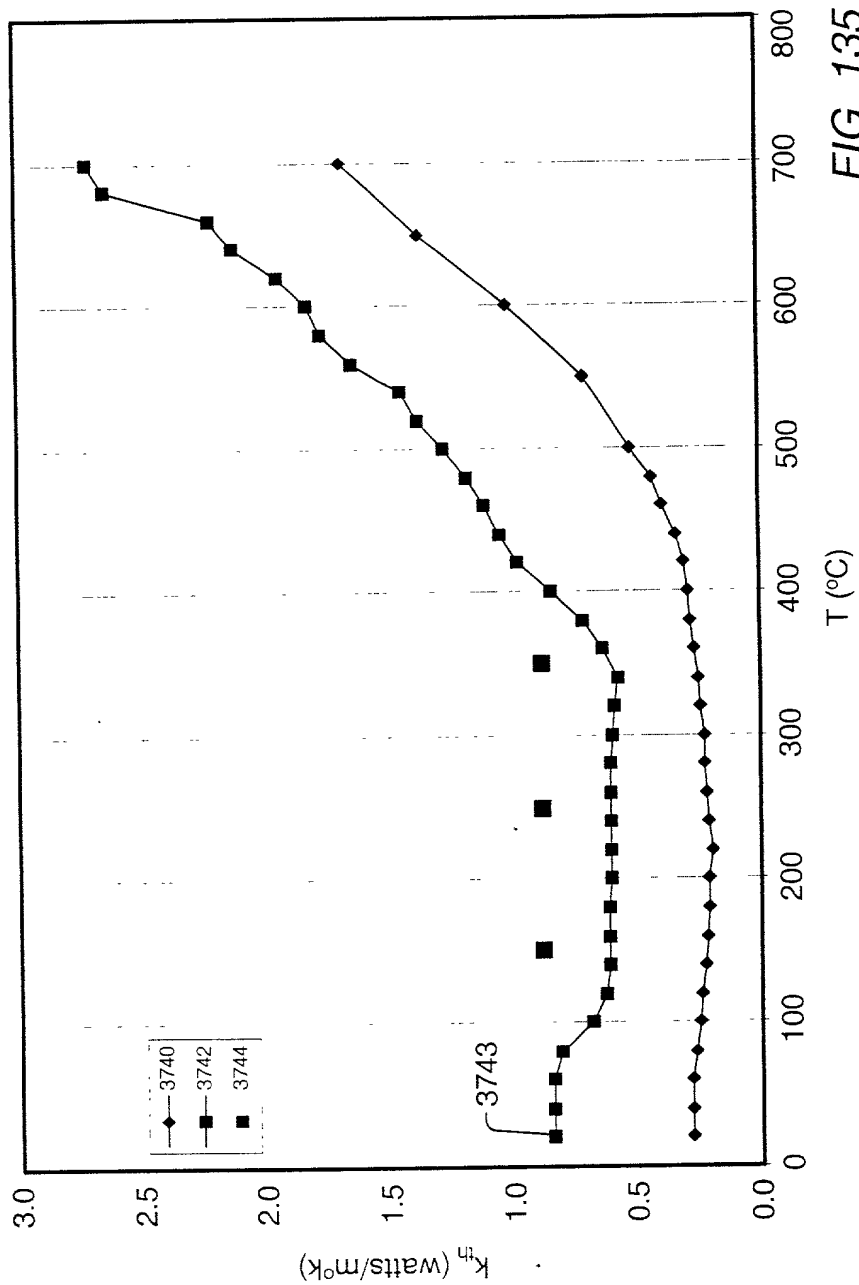


FIG. 135

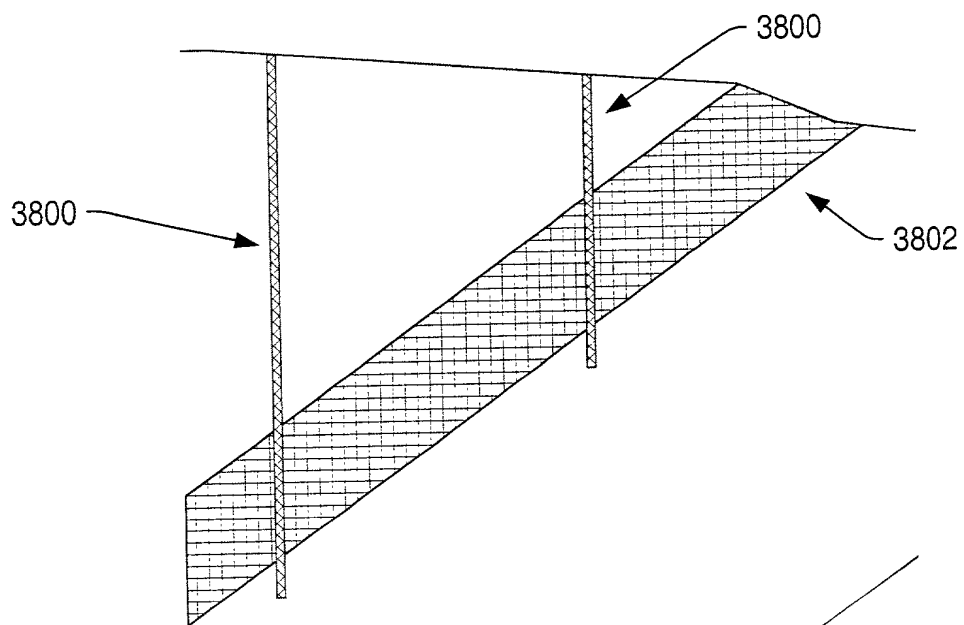


FIG. 136

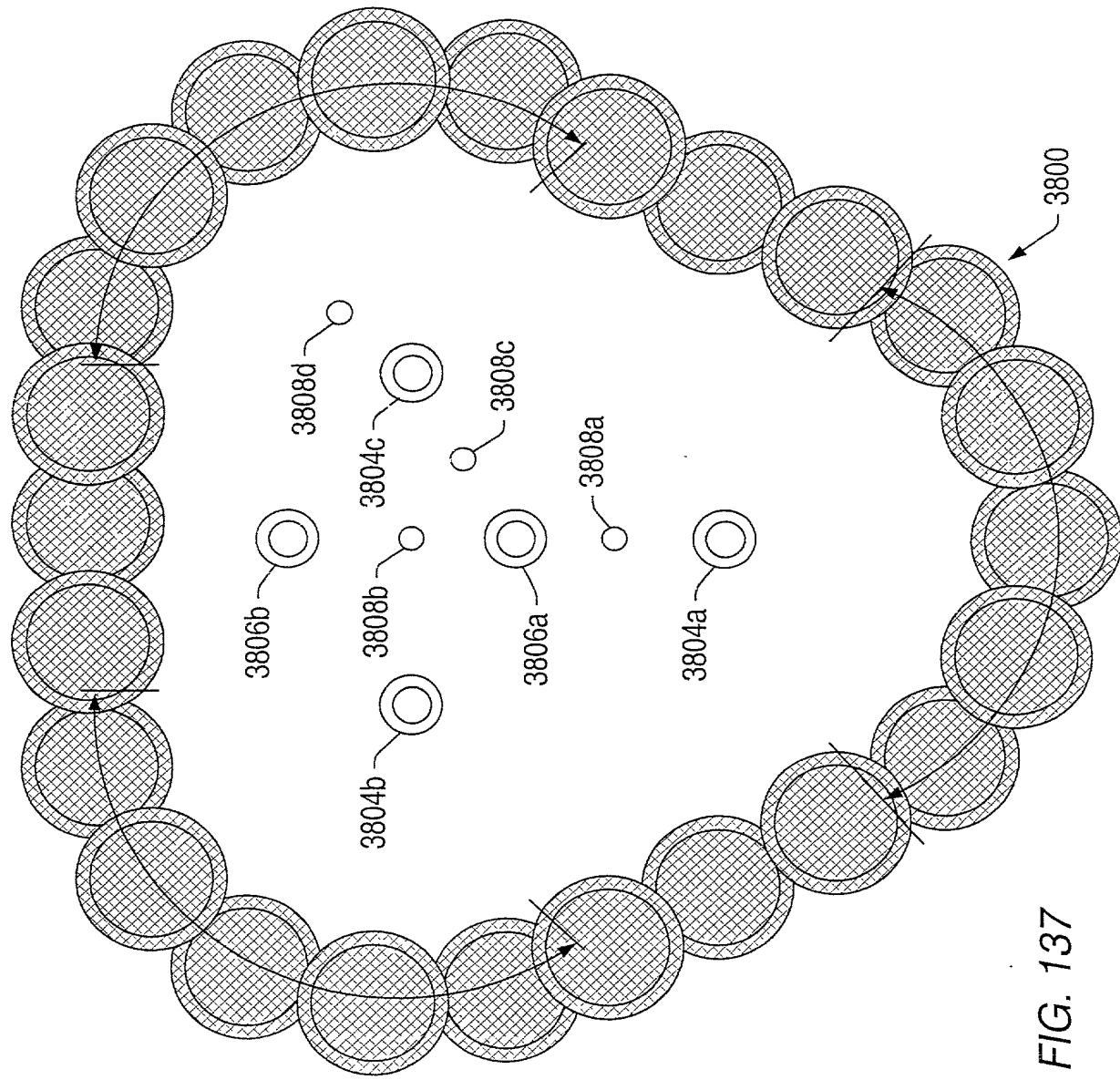
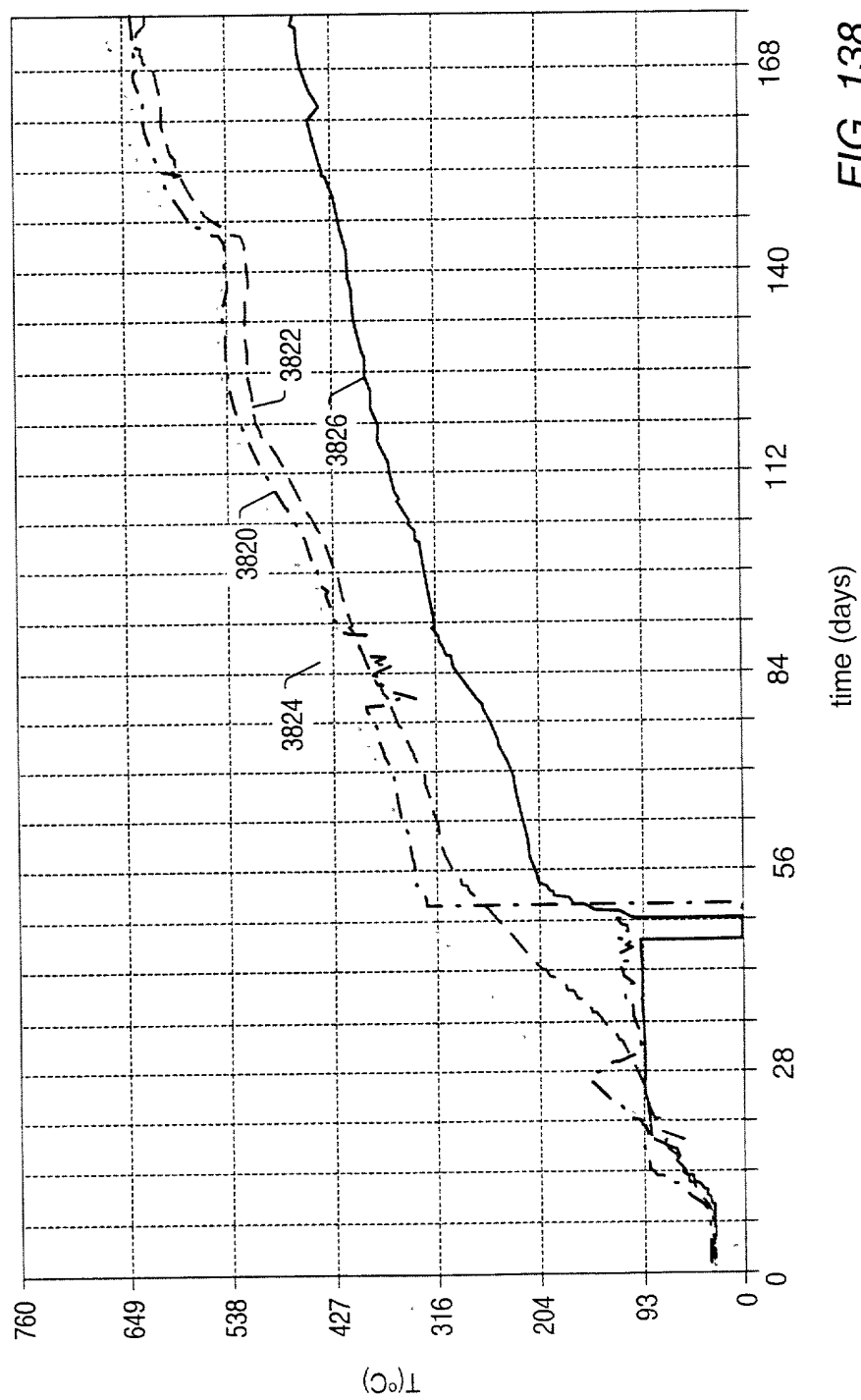


FIG. 137



time (days)

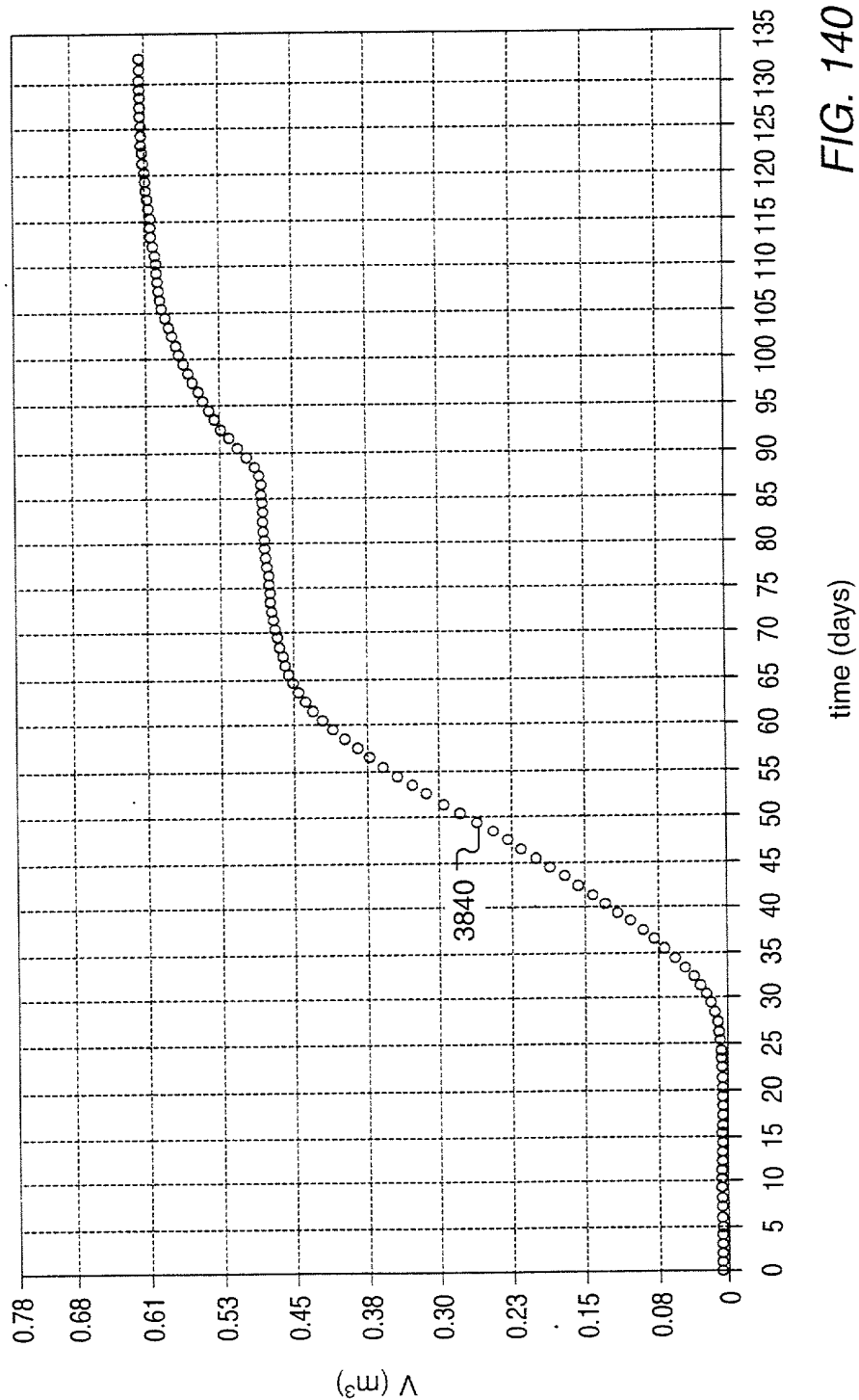
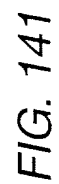


FIG. 140



1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444
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FIG. 142

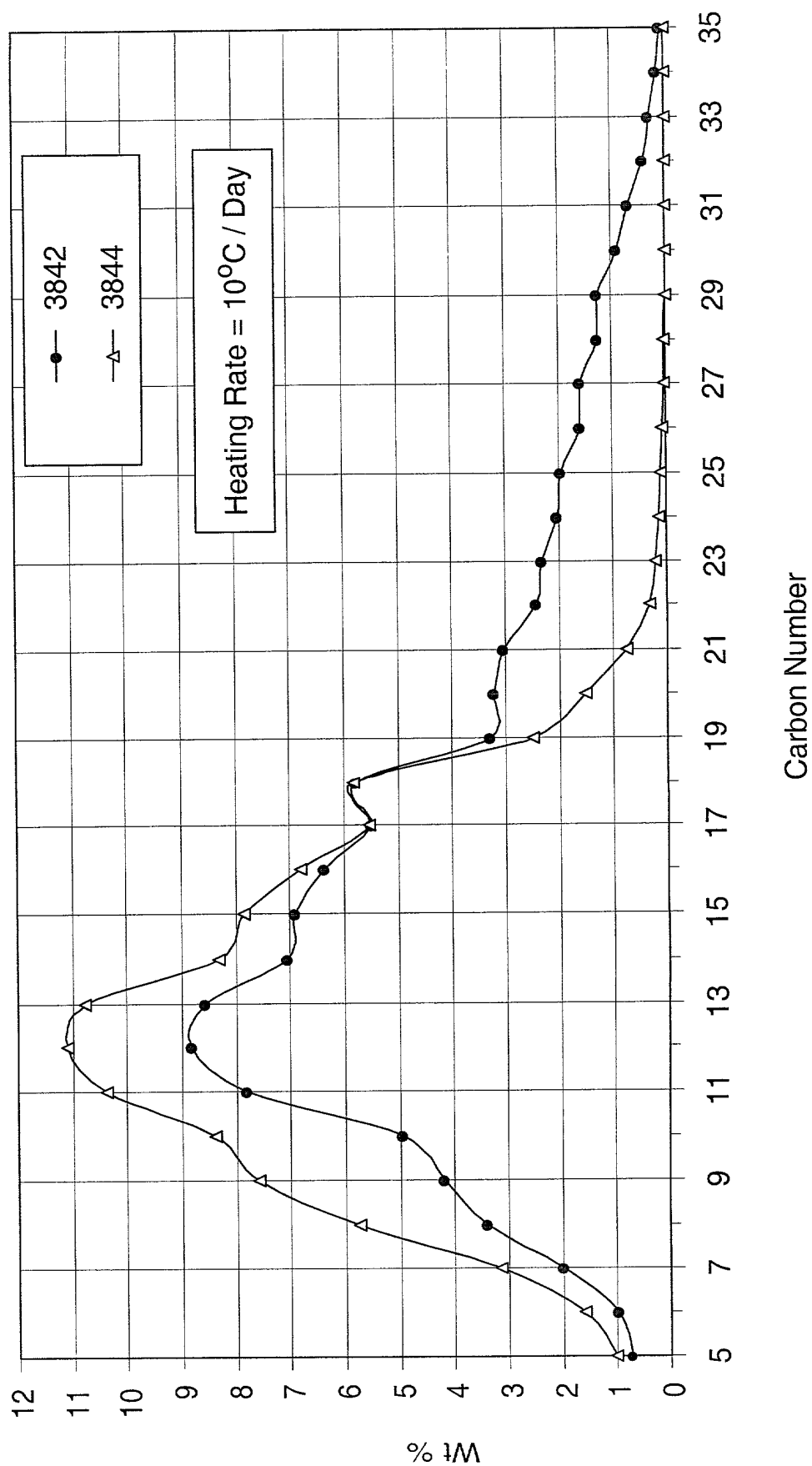


FIG. 142

FIG. 143

Source: Data from the U.S. Geological Survey, 1998. The data are based on a review of the literature and are not necessarily representative of all cases.

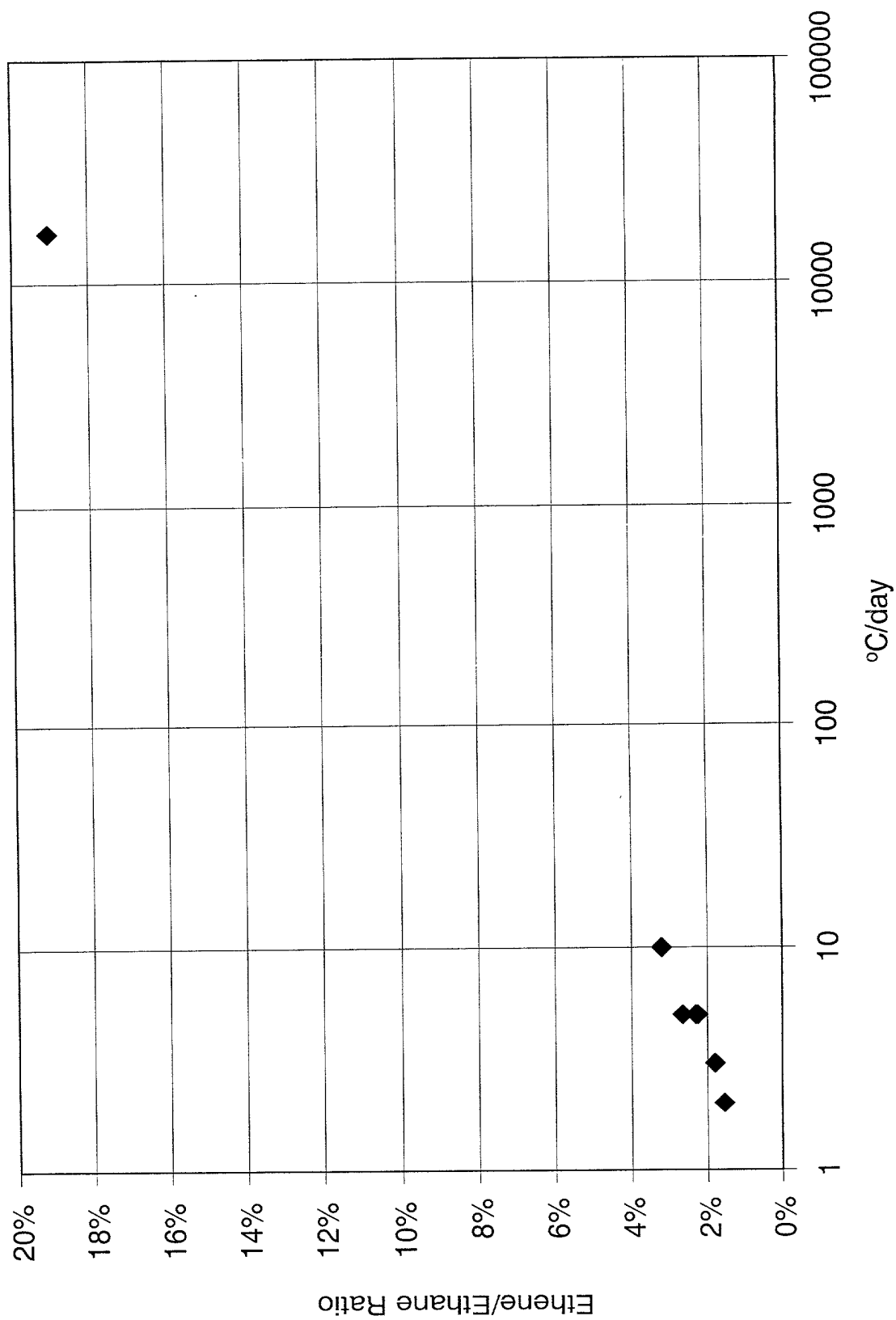


FIG. 144

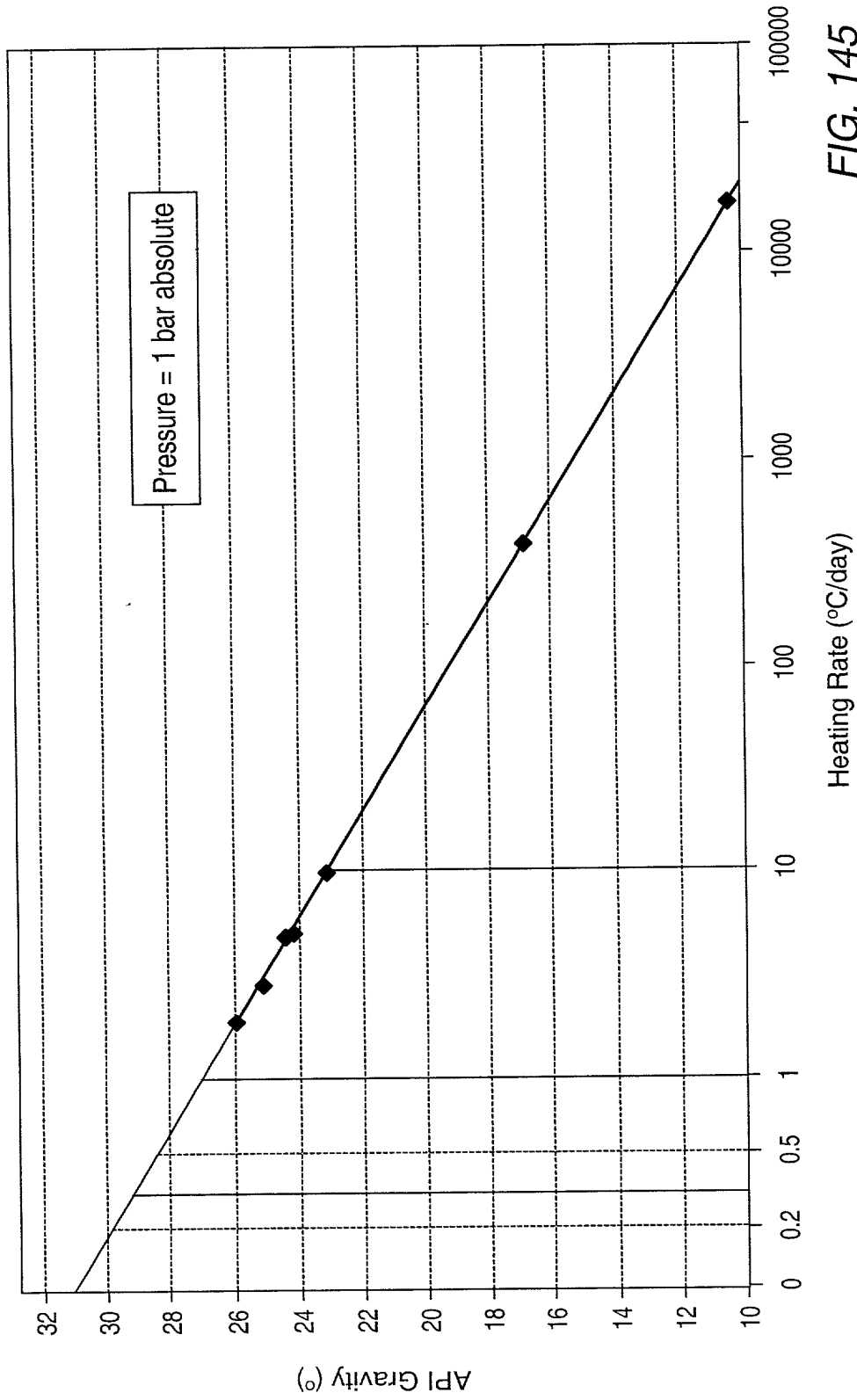


FIG. 145

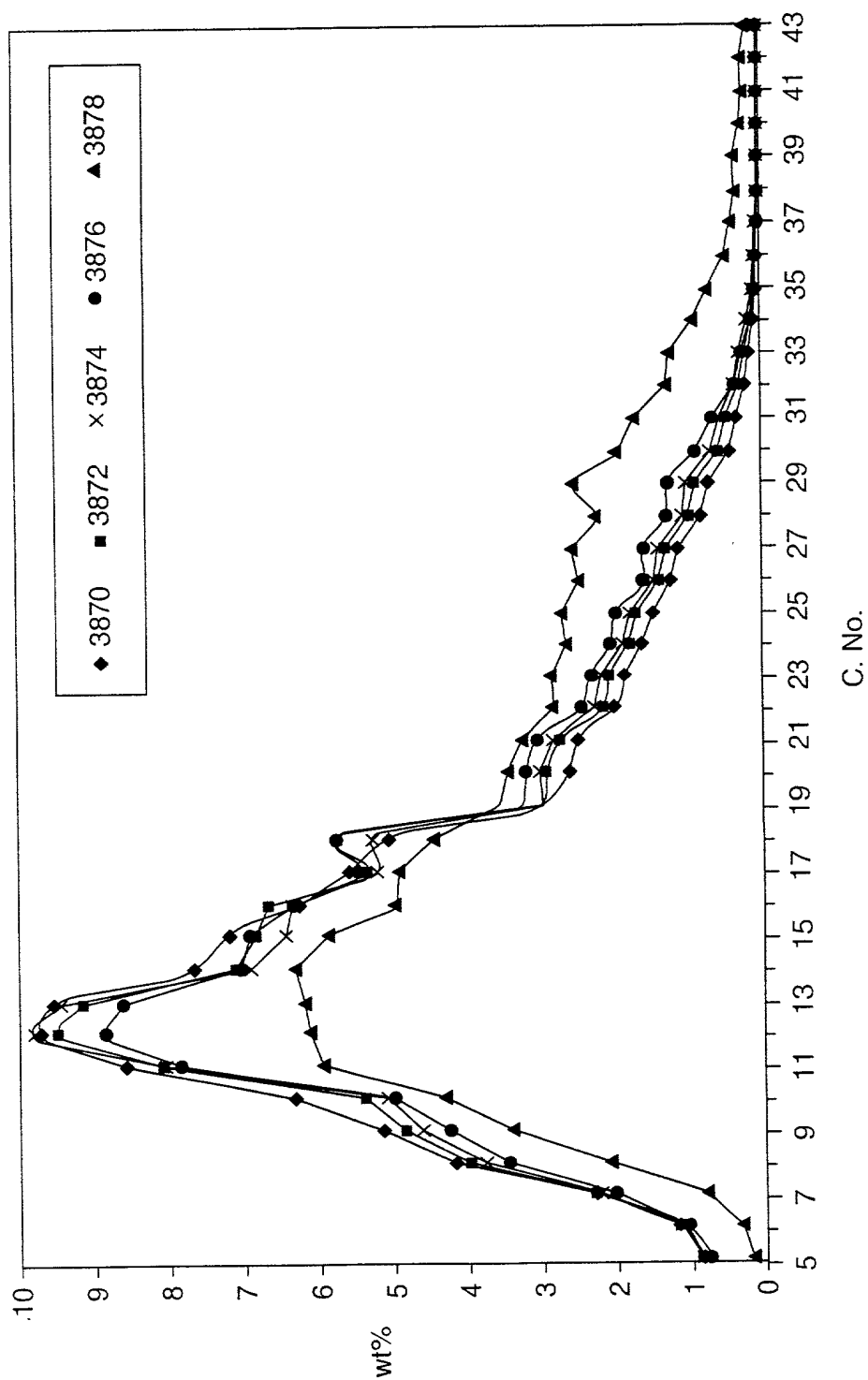


FIG. 146

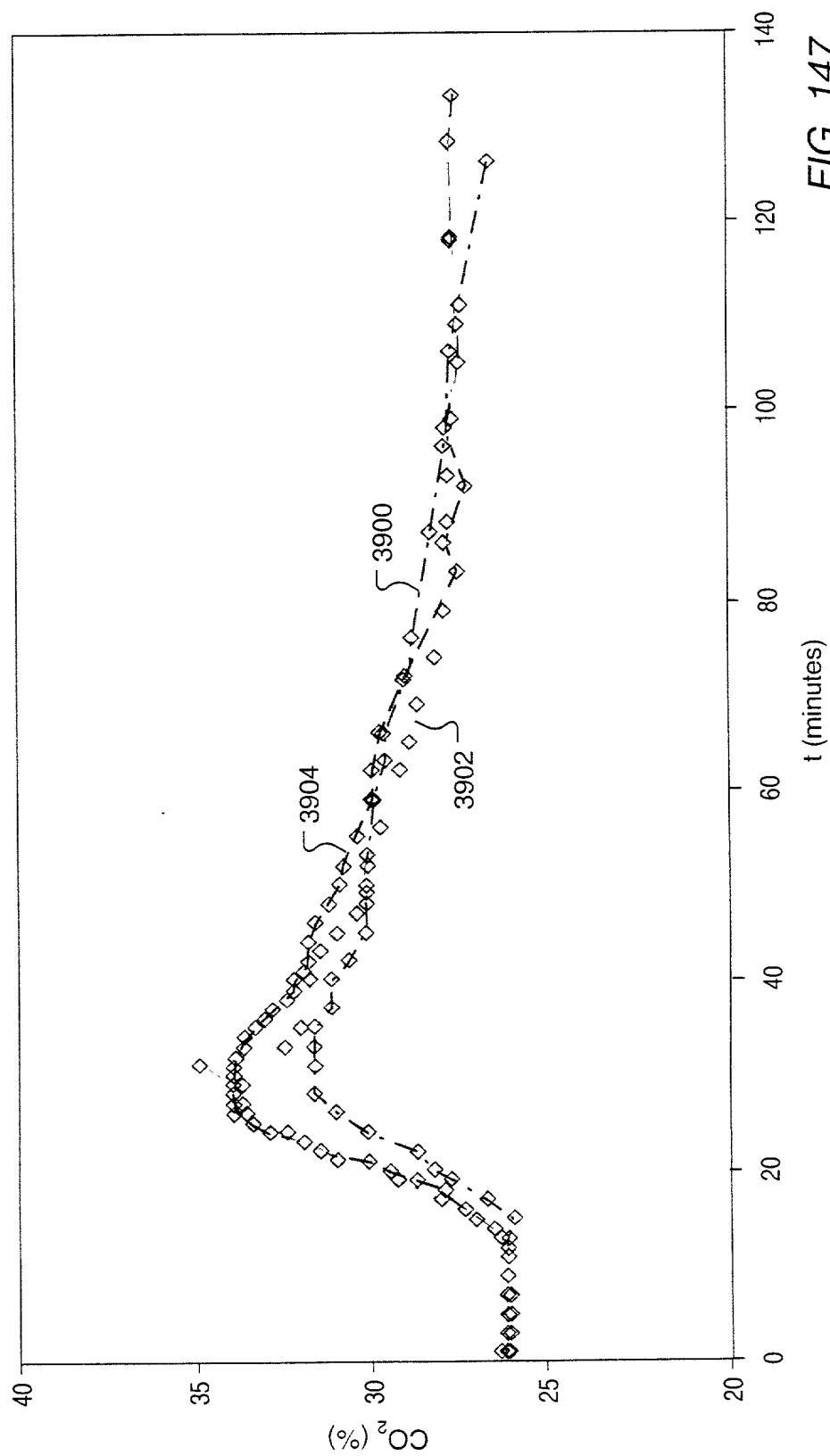
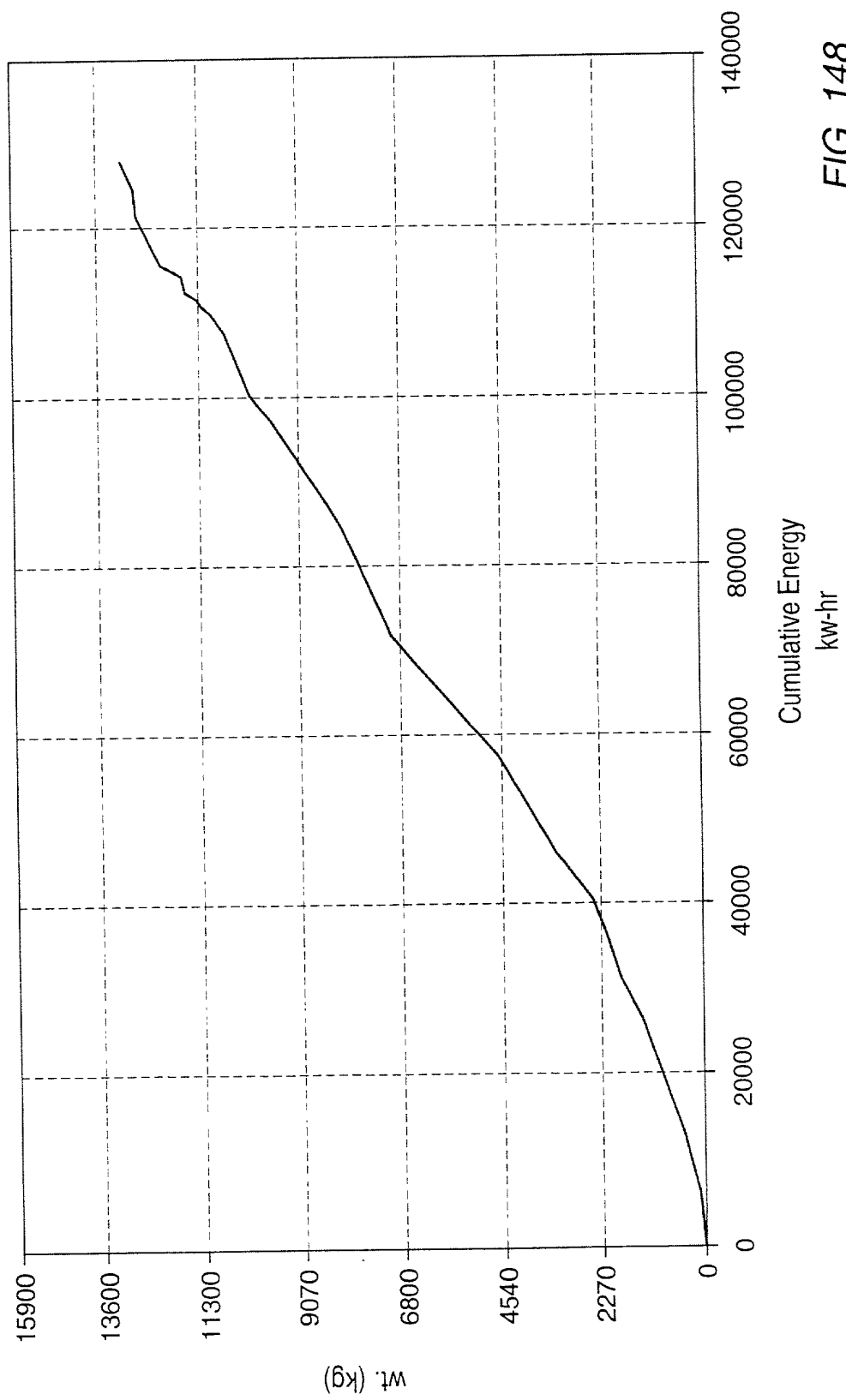


FIG. 147



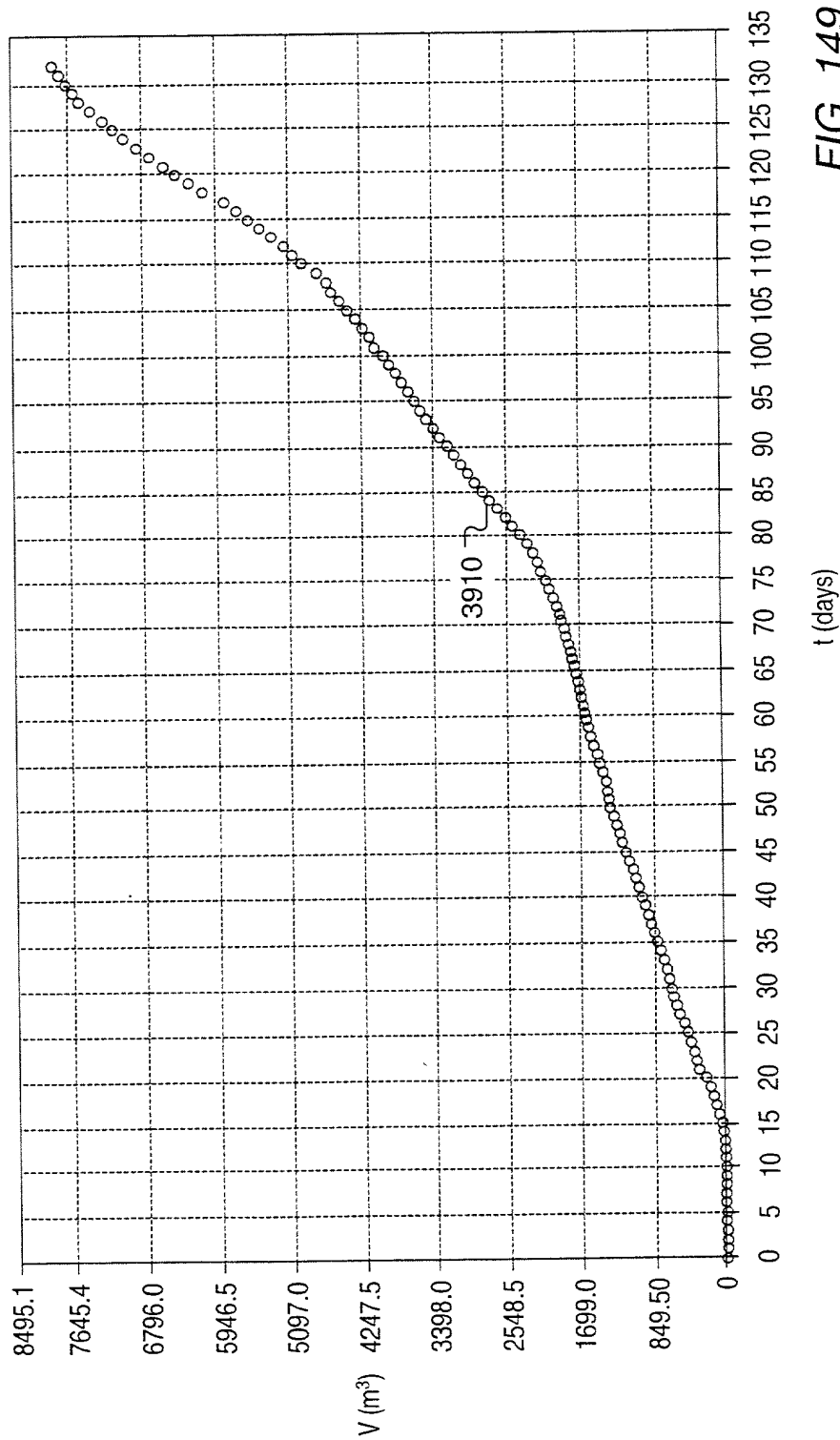


FIG. 149

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 000000 000000 000000 000000 000000 000000 000000 000000 000000 000000

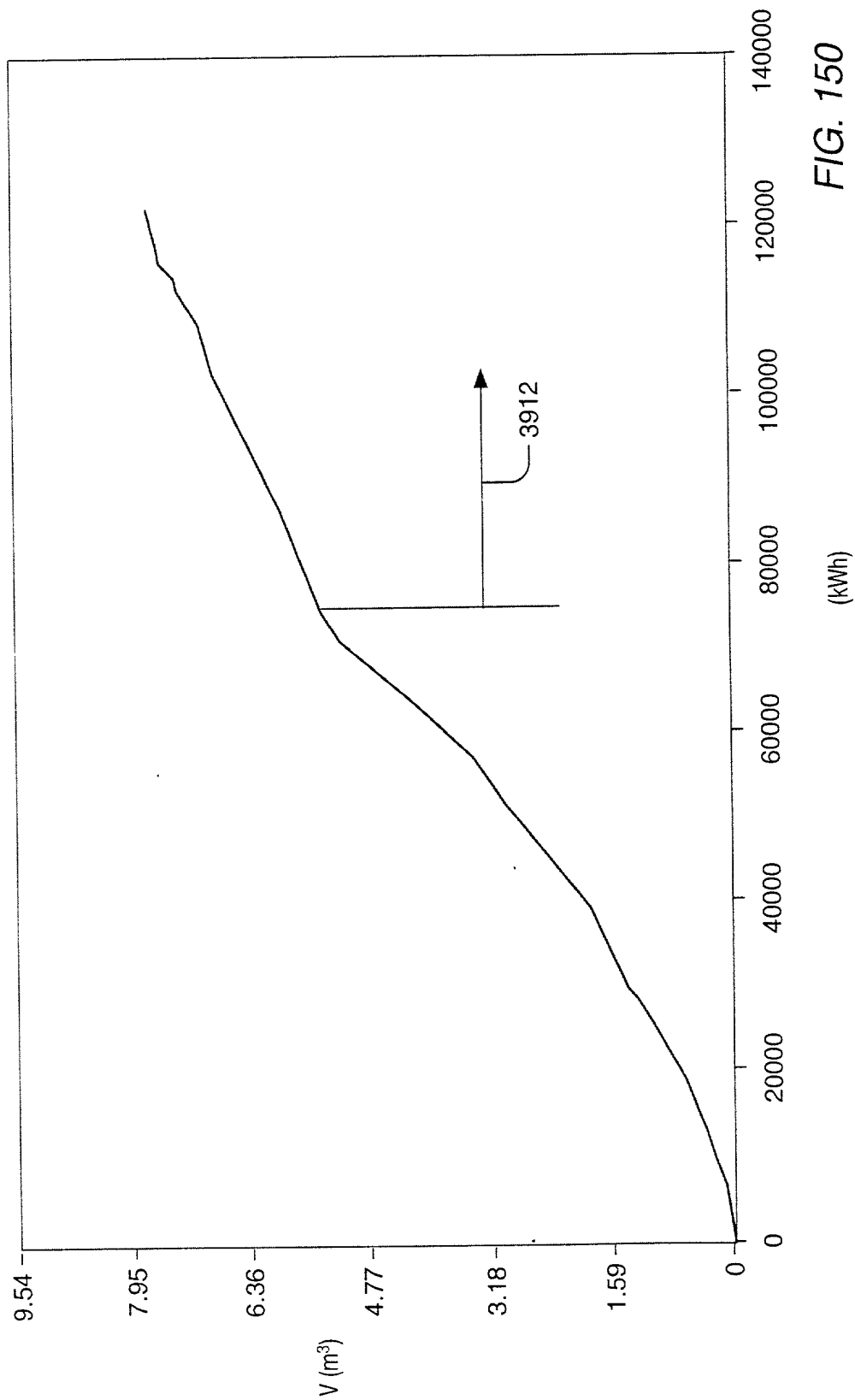


FIG. 150

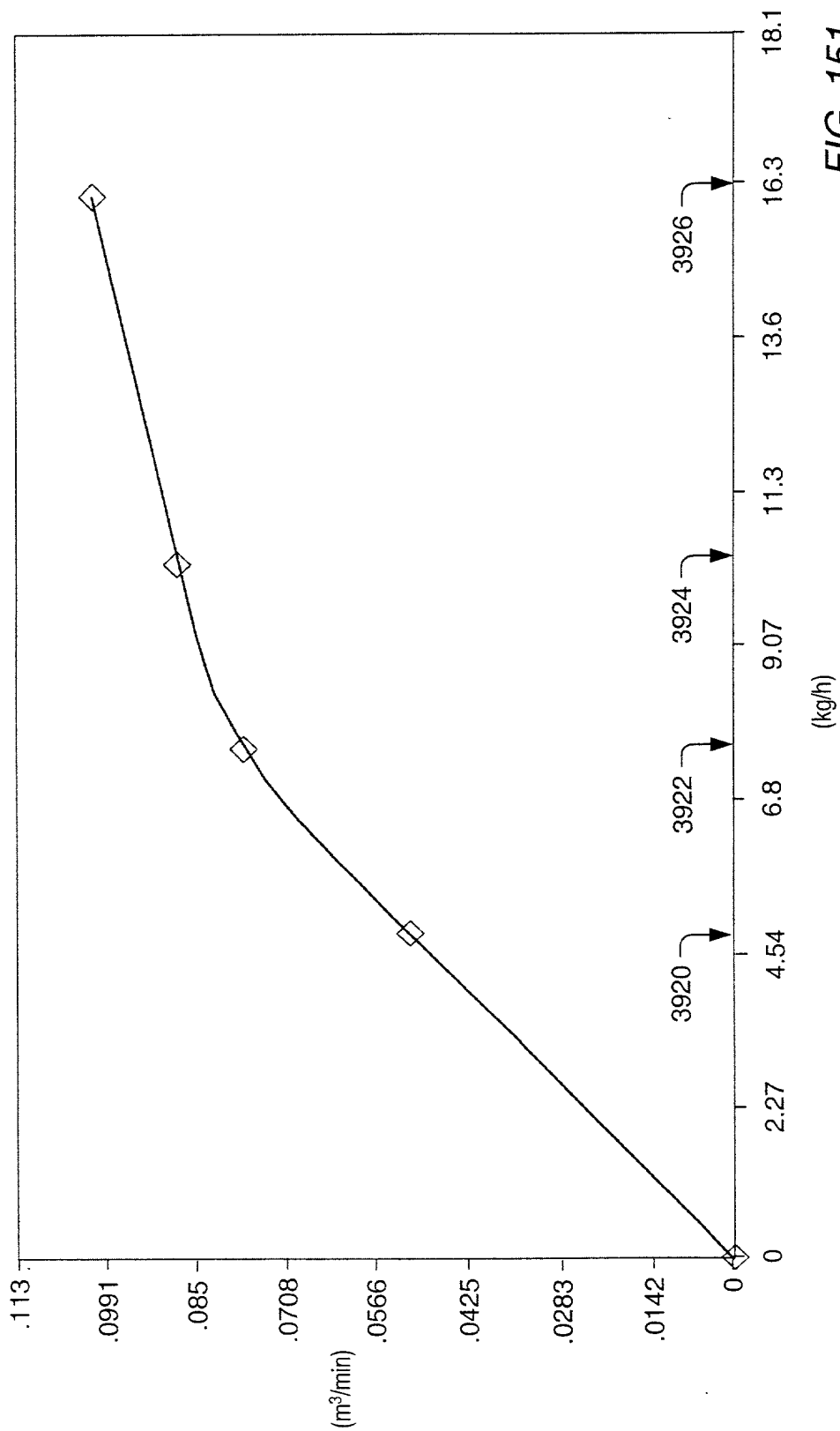


FIG. 151

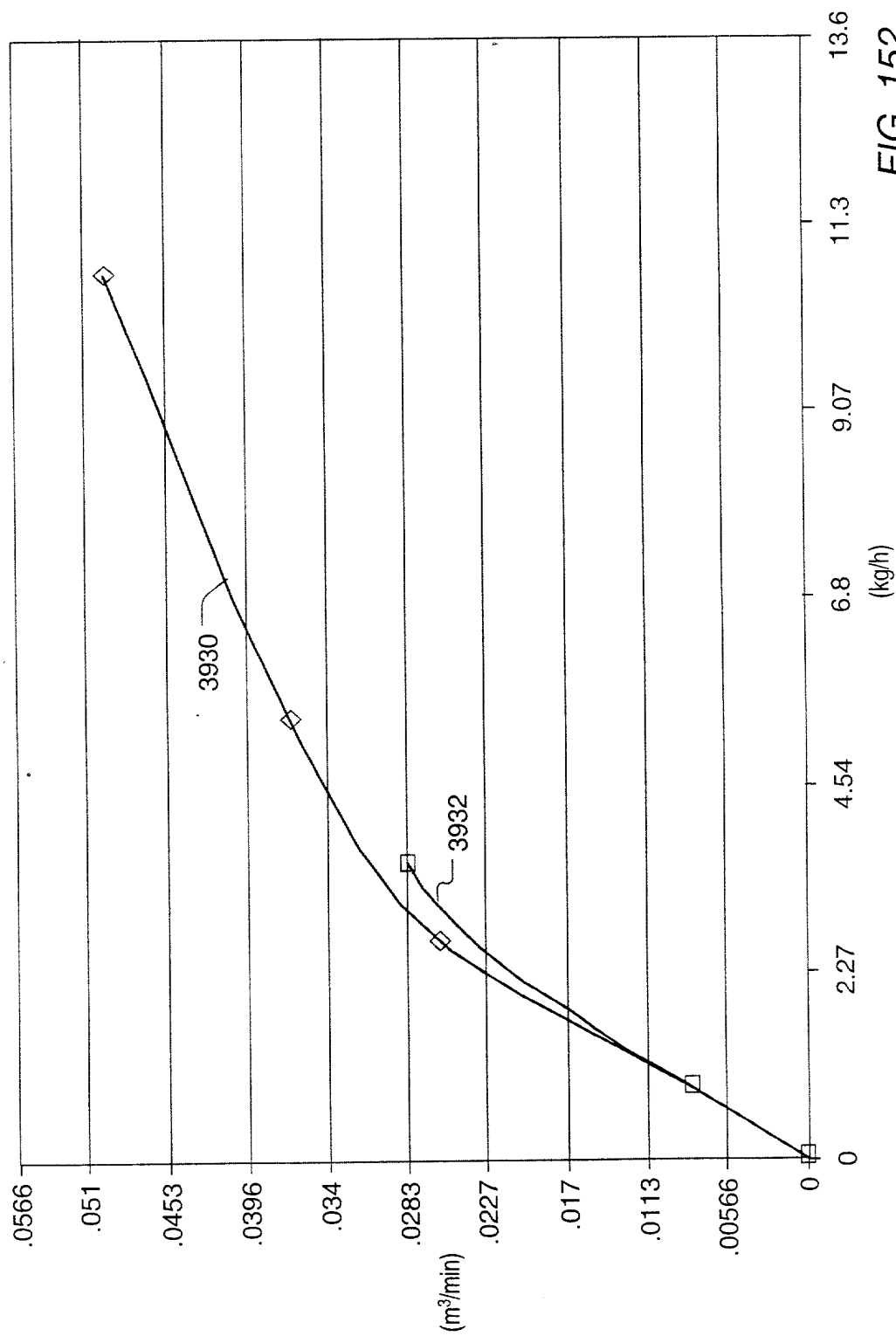


FIG. 152

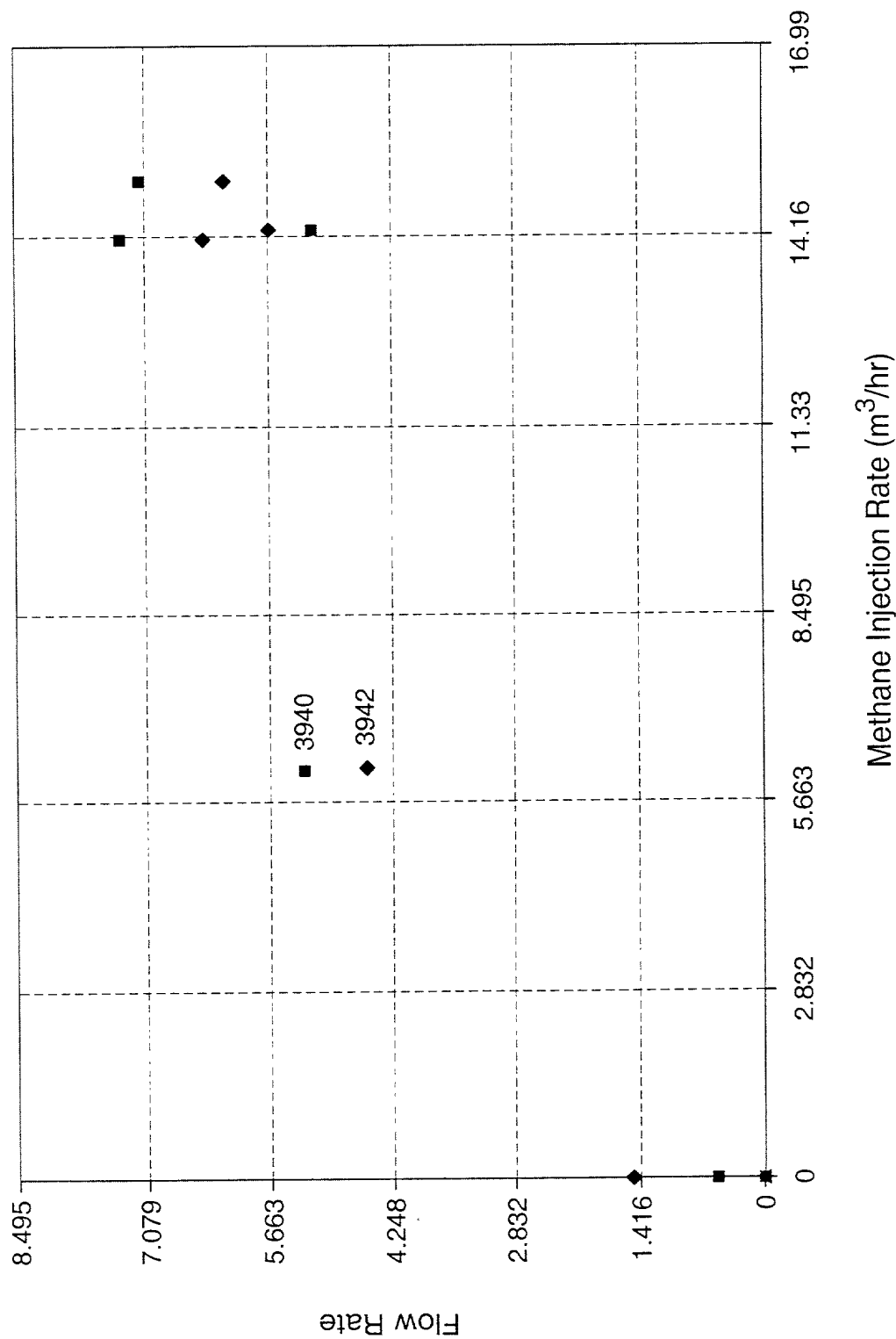


FIG. 153

11.33 9.911 8.495 7.079 5.663 4.248 2.832 1.416 0
 0 1.416 2.832 4.248 5.663 7.079 8.495 9.911 11.33
 0 1.416 2.832 4.248 5.663 7.079 8.495 9.911 11.33

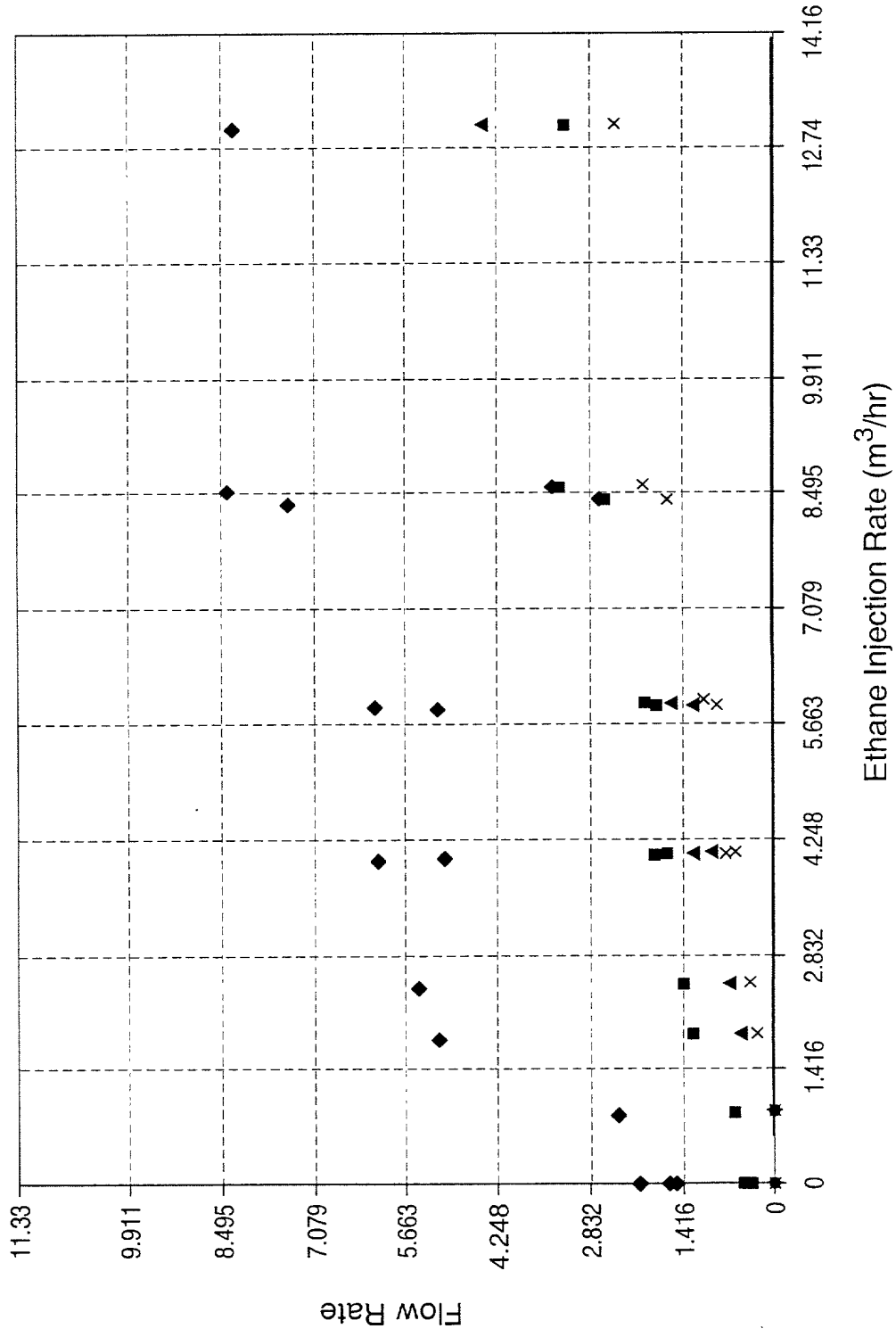


FIG. 154

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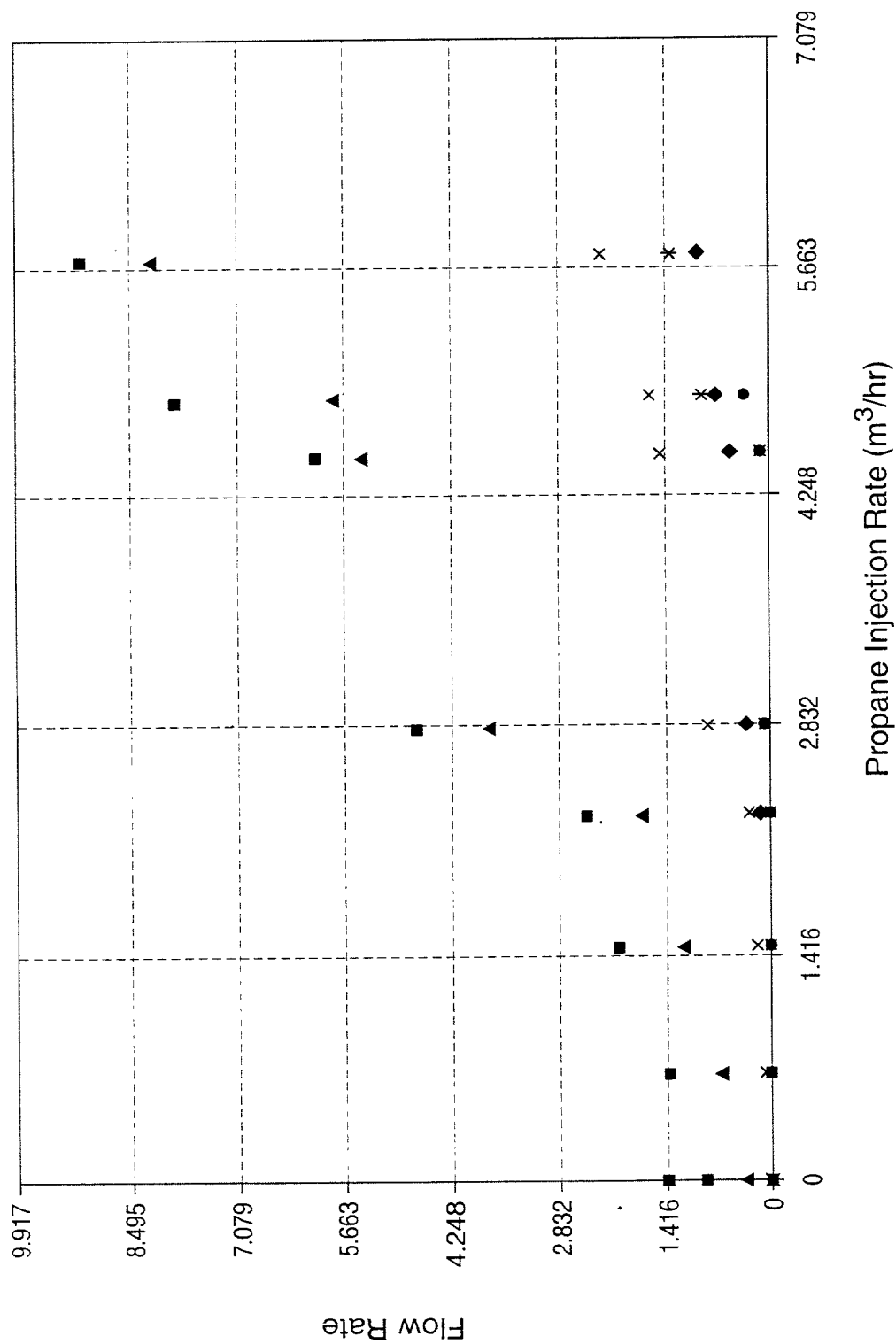
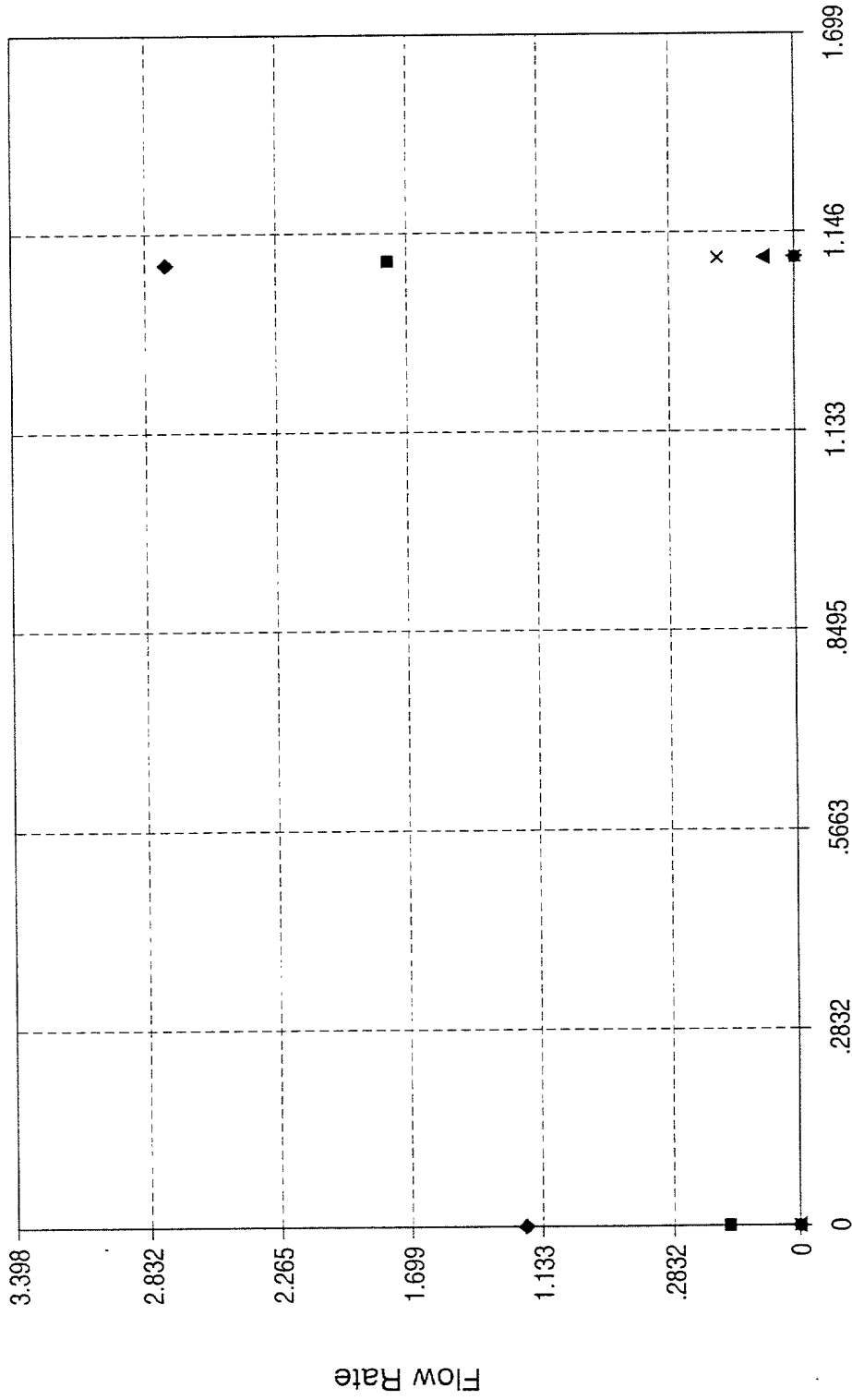


FIG. 155

1000 800 600 400 200 0
 3.398 2.832 2.265 1.699 1.133 .8495 .5663 .2832 0
 Butane Injection Rate (m³/hr)



Butane Injection Rate (m³/hr)

■ 3970 ▲ 3972 ◆ 3974 × 3976 * 3978 ● 3979

FIG. 156

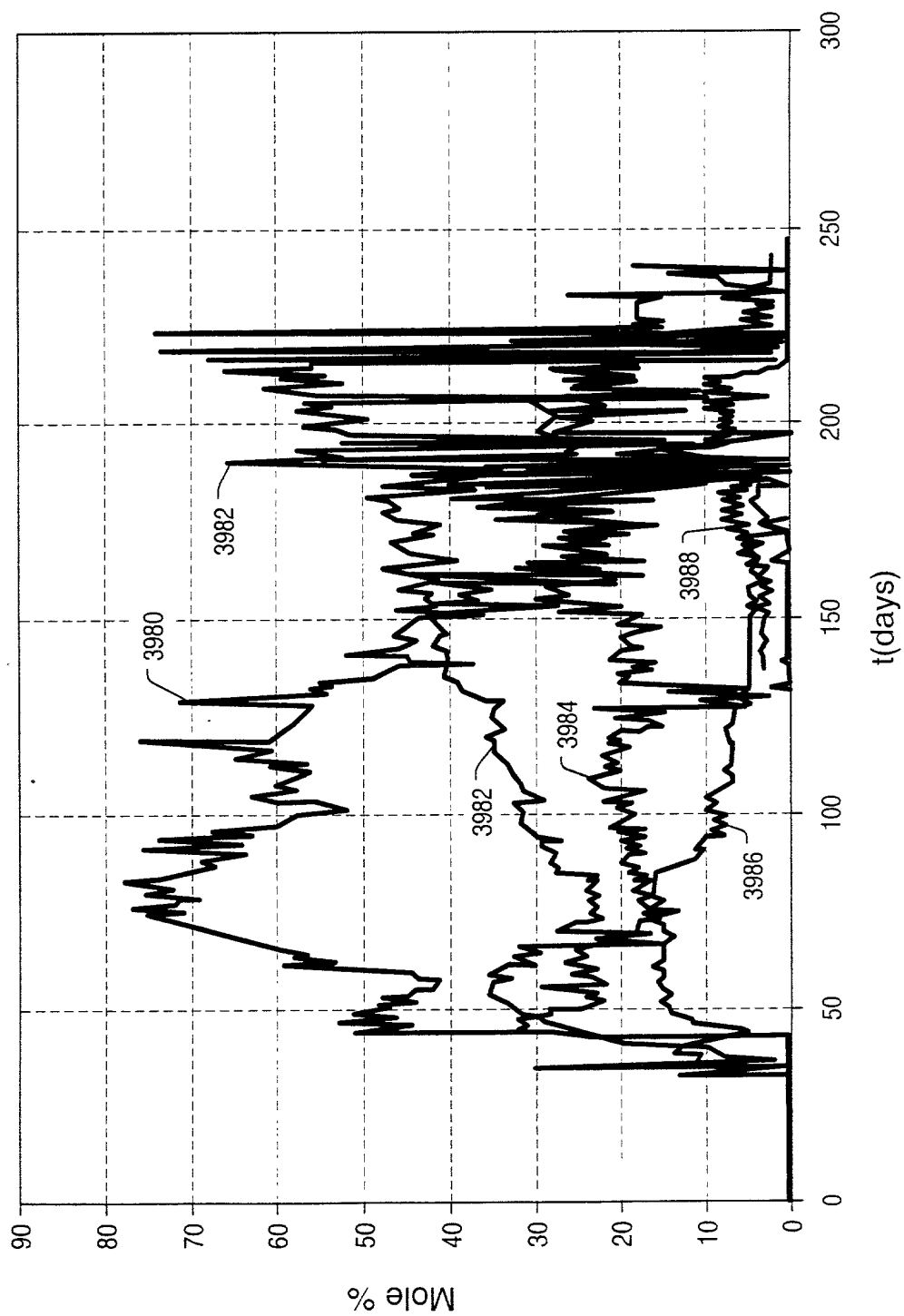
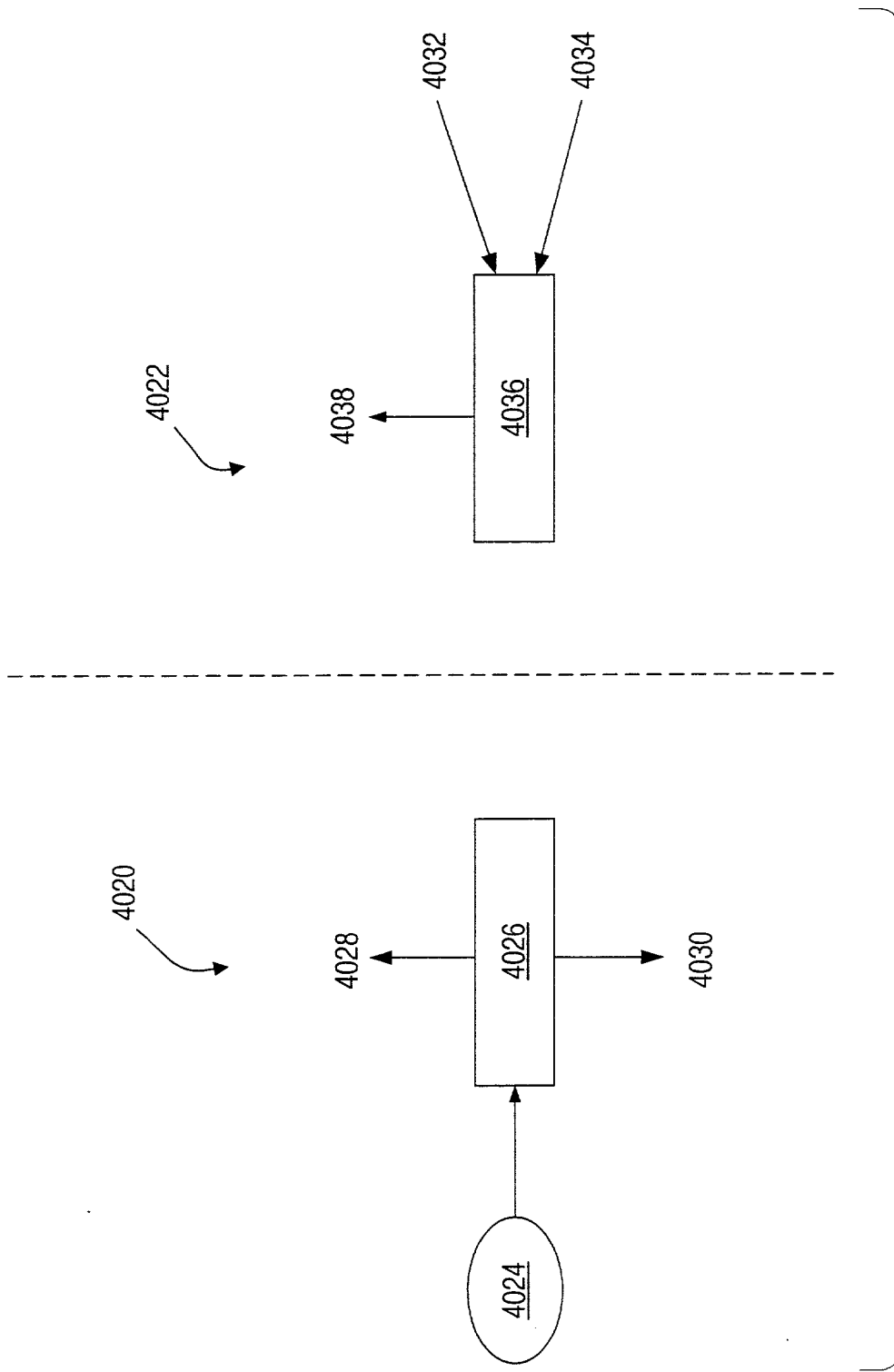


FIG. 157

$$t(h)$$



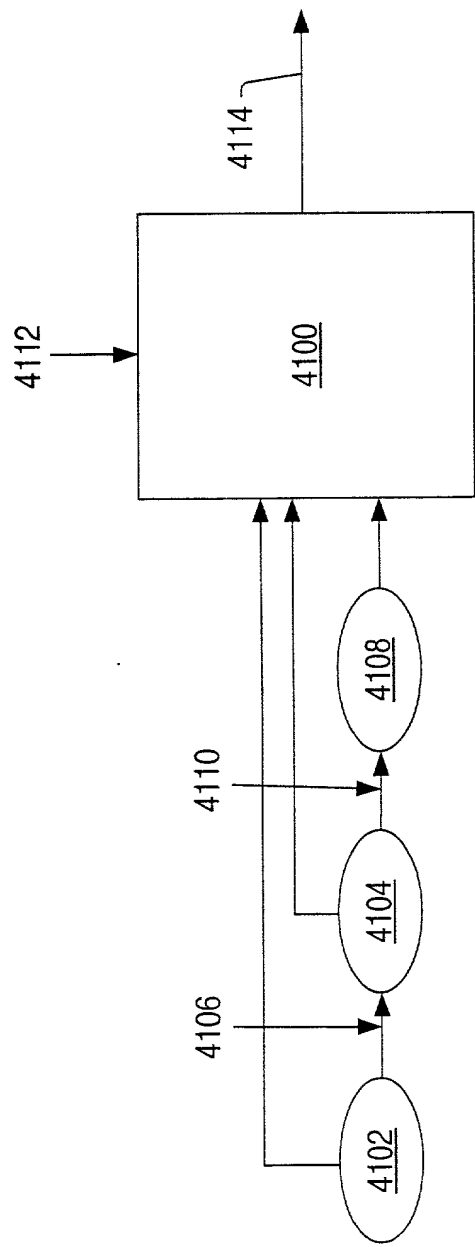


FIG. 162

FIG. 163 is a block diagram of a system 4200. The system 4200 includes a processor 4202, a memory 4204, and a network interface 4208. The processor 4202 is connected to the memory 4204 and the network interface 4208. The memory 4204 is connected to the network interface 4208. The network interface 4208 is connected to a network 4210. The network 4210 is connected to a server 4212. The server 4212 is connected to a database 4214.

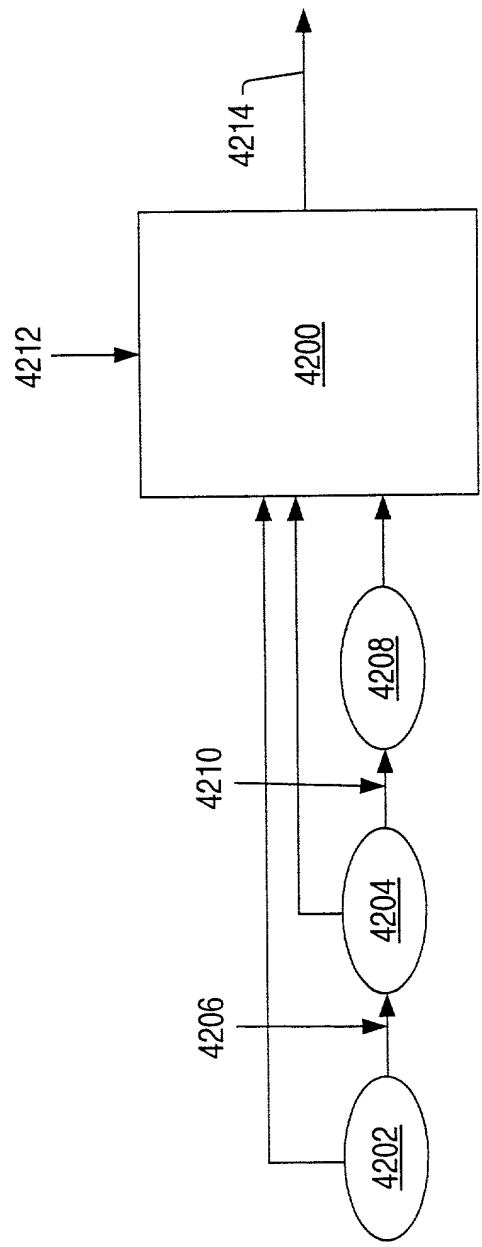


FIG. 163

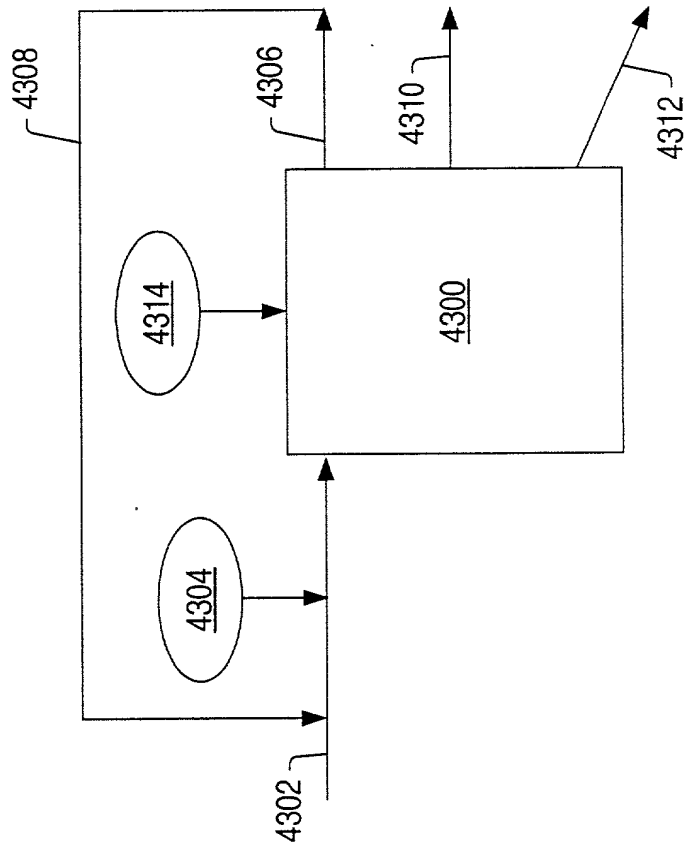


FIG. 164

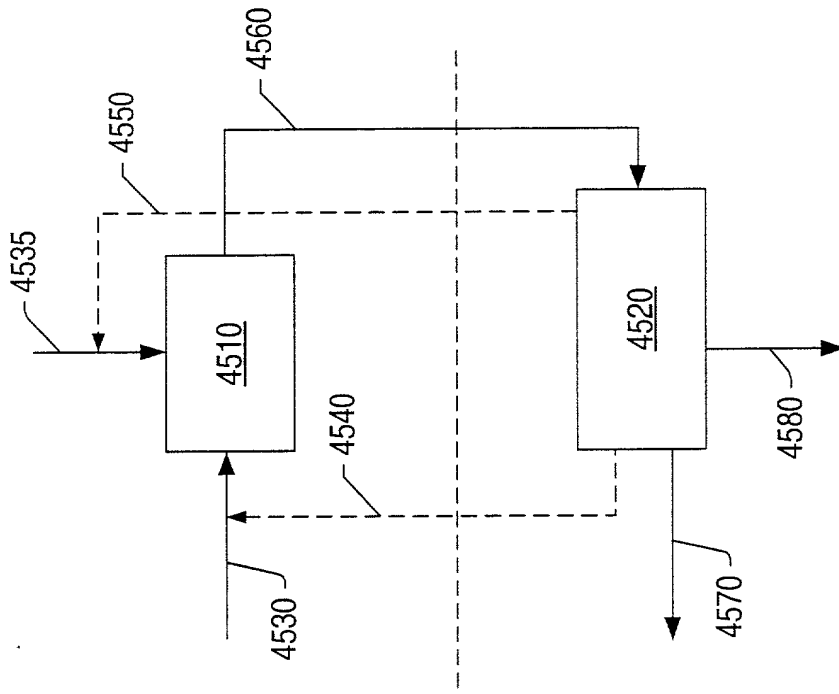


FIG. 166

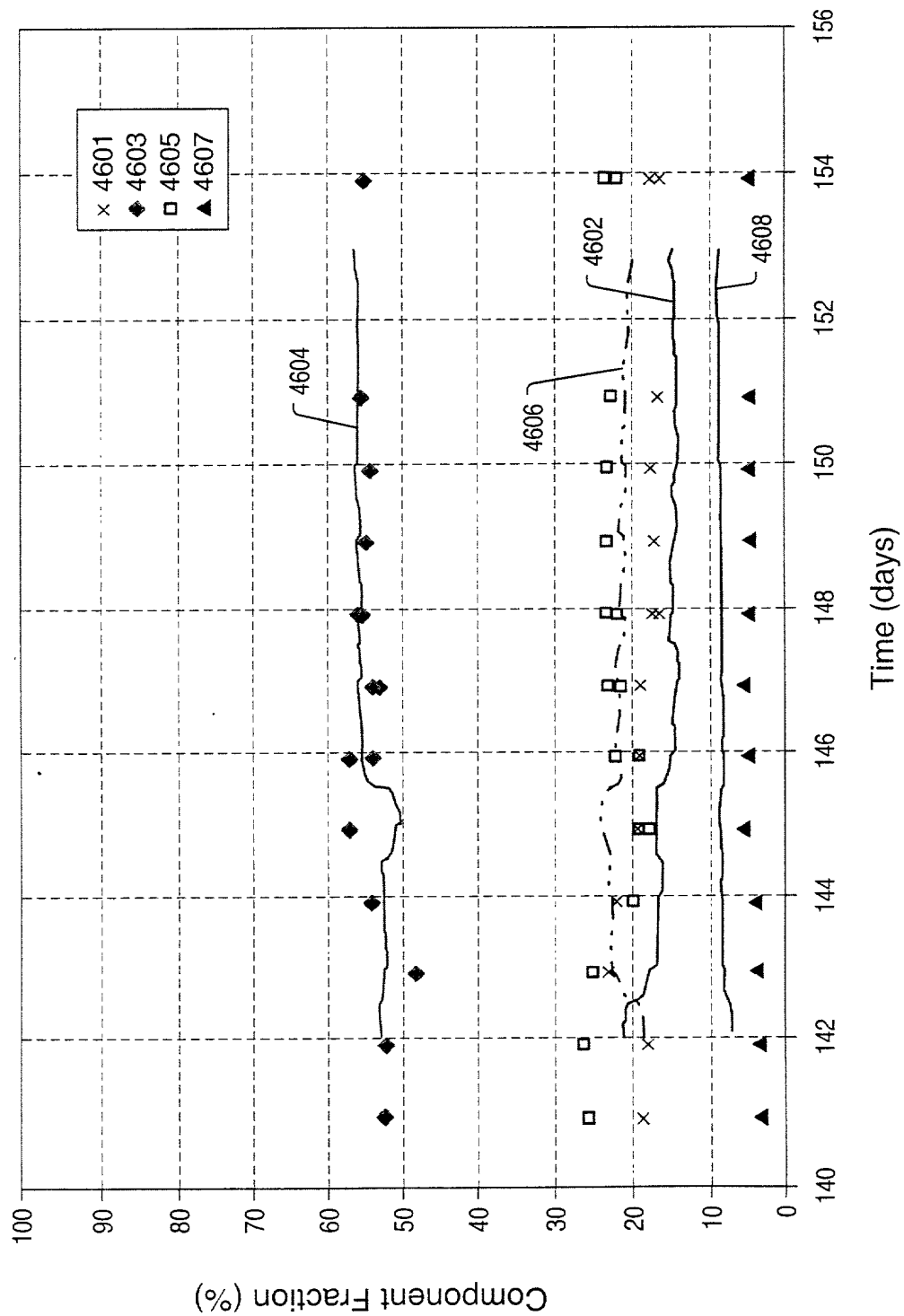


FIG. 167

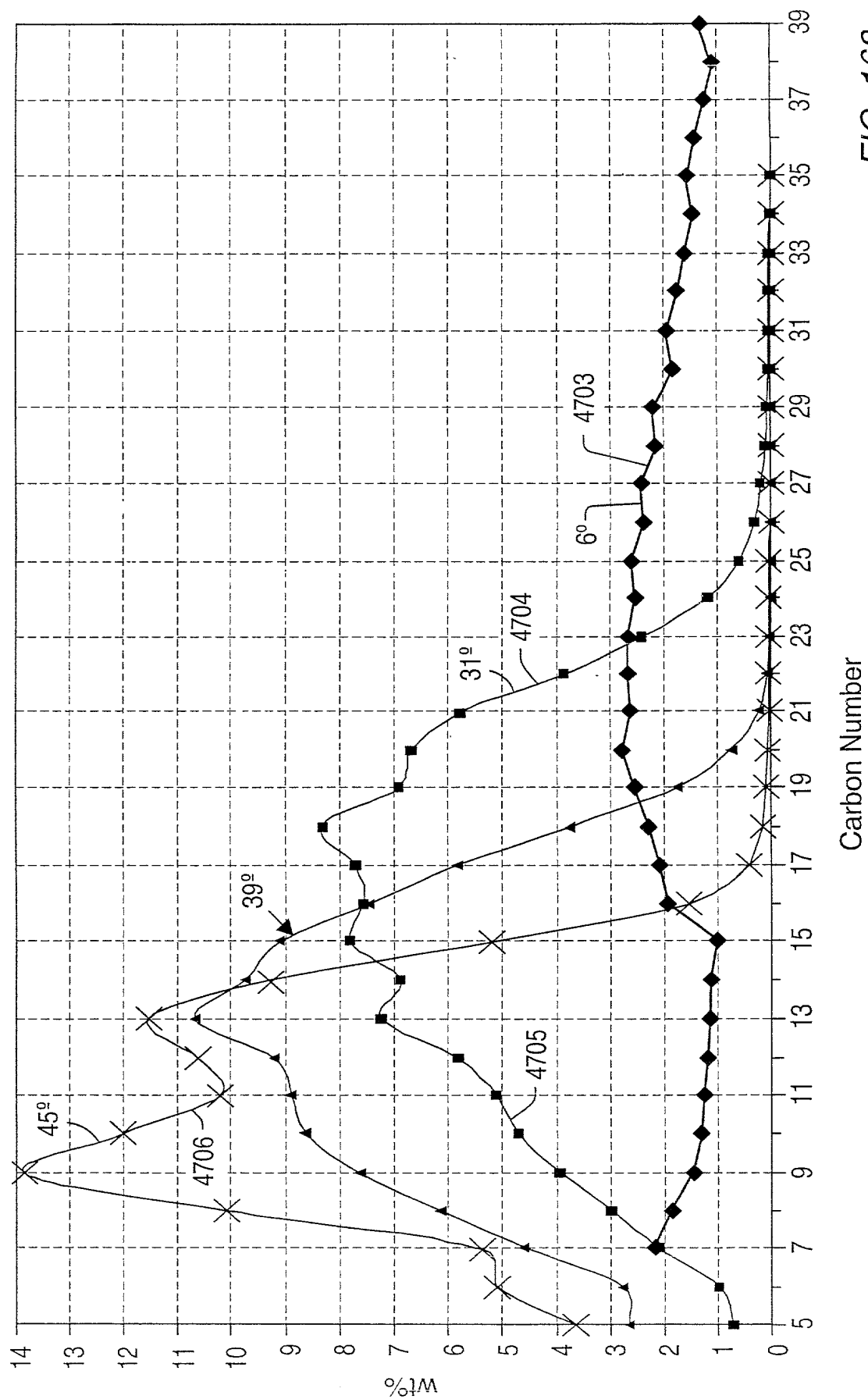


FIG. 168

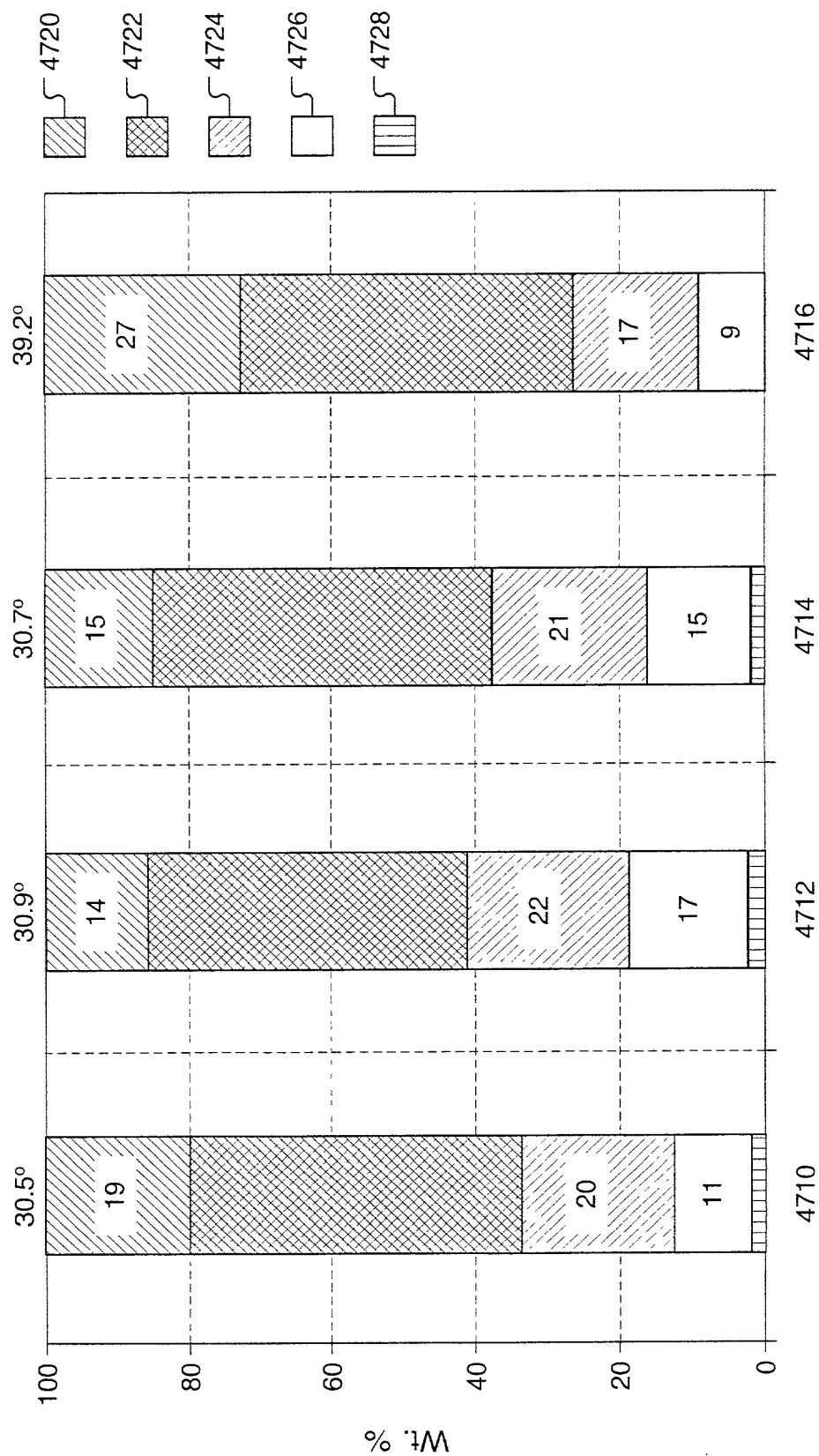


FIG. 169

FIG. 170

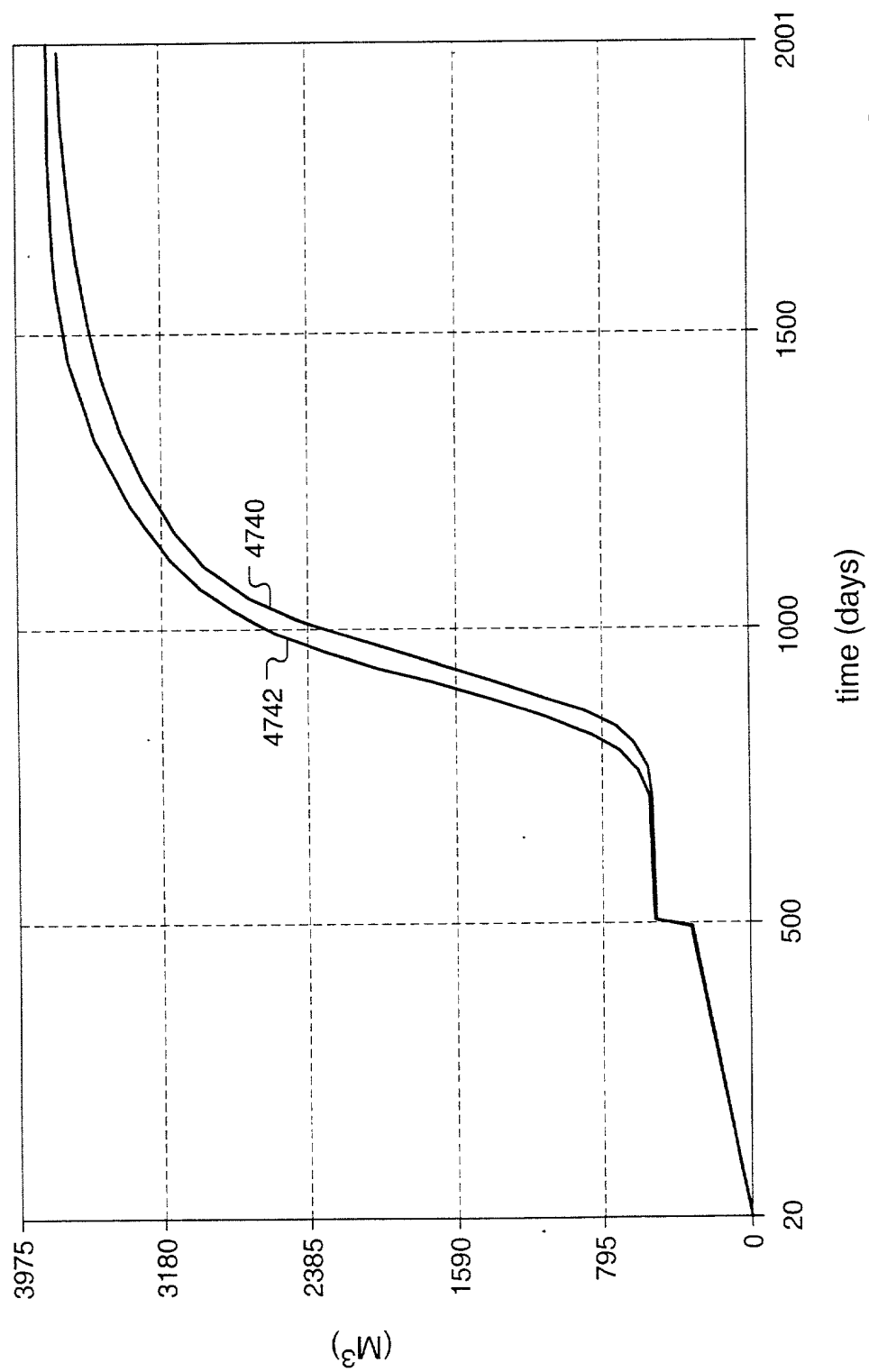


FIG. 170

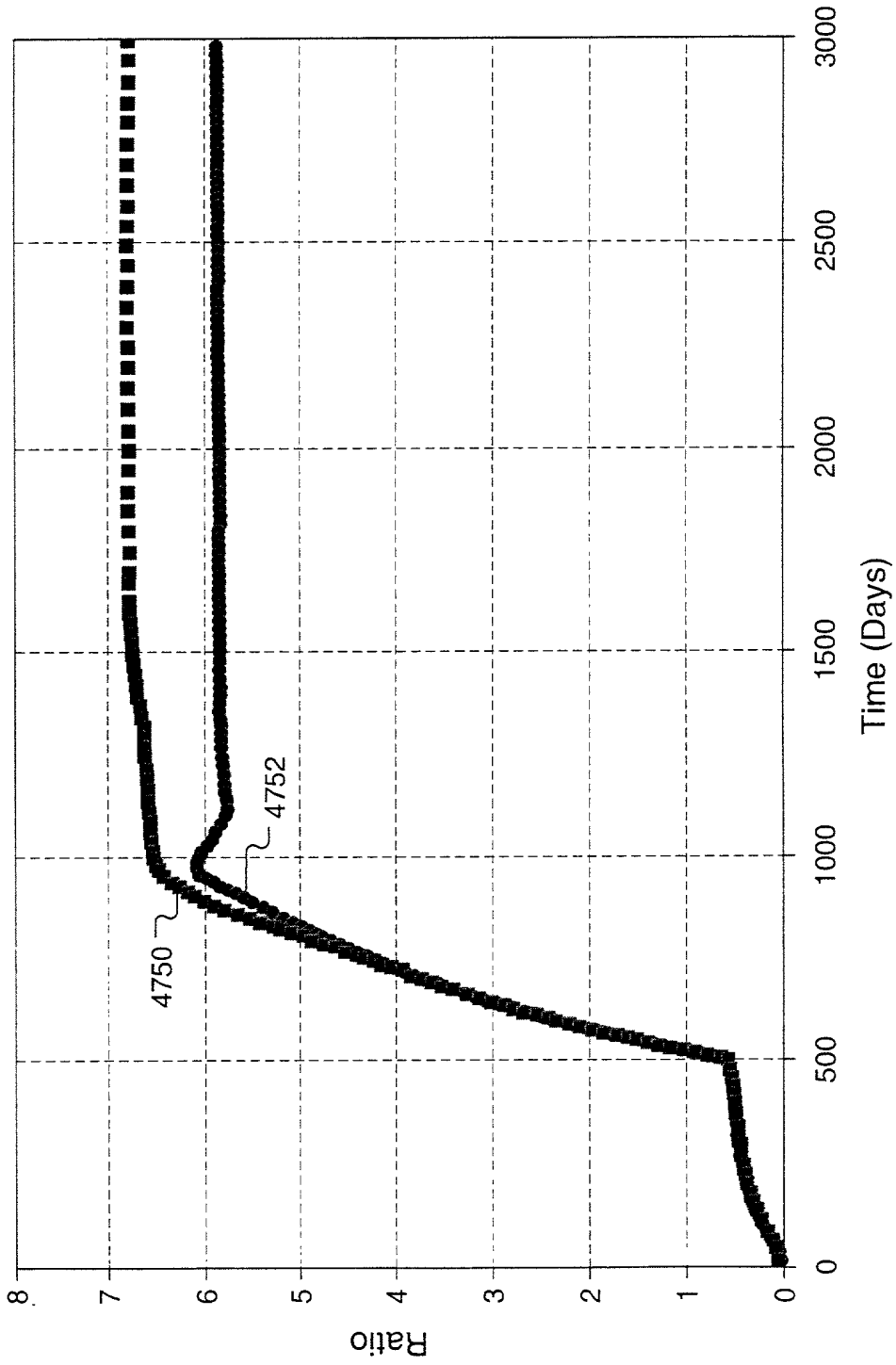
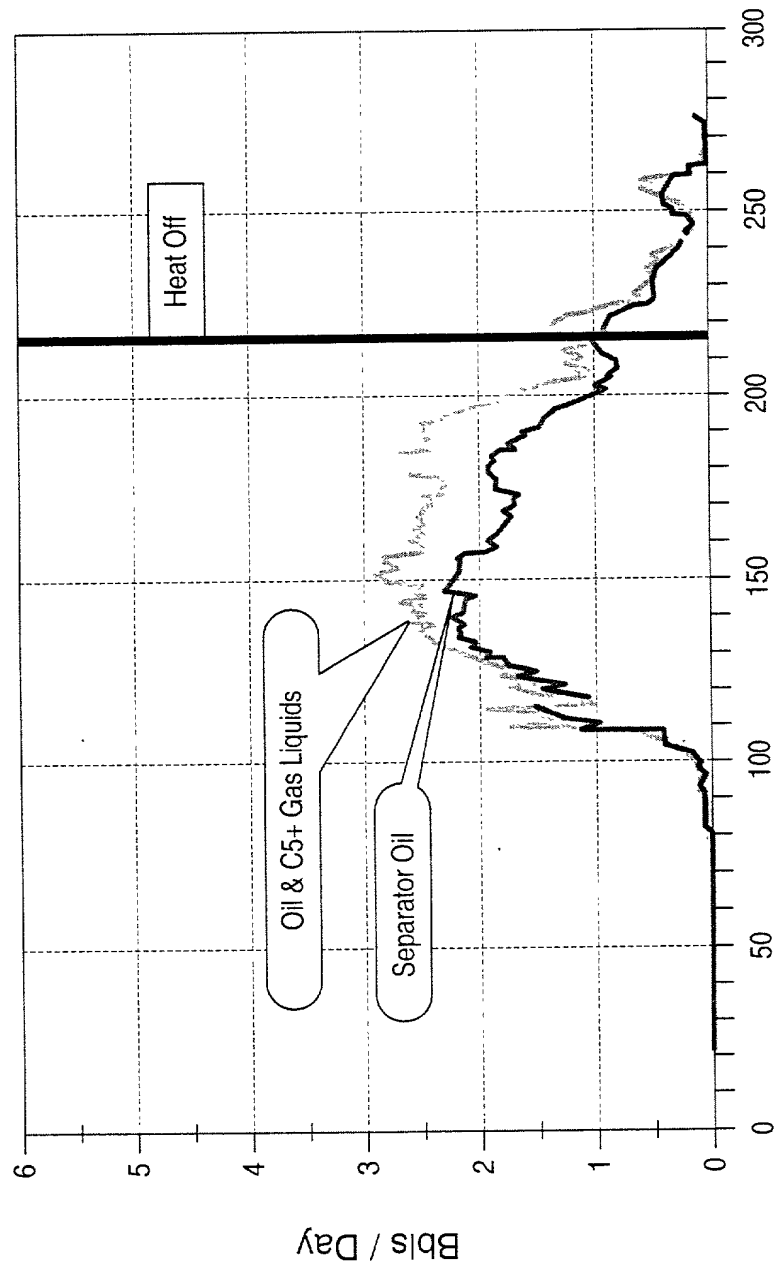


FIG. 171



Days From Start of Heat Injection

FIG. 175

FIG. 176 is a graph showing the production of hydrocarbon liquids, gas, and water from a well over a period of 600 hours. The graph is divided into three sections by vertical lines at 300 and 400 hours. The first section (0-300 hours) is labeled "Heat Off". The second section (300-400 hours) is labeled "Gas". The third section (400-600 hours) is labeled "Water". The y-axis represents the production rate in Bbls/Day for hydrocarbon liquids, in MCF/Day for gas, and in Bbls/Day for water. The x-axis represents time in hours.

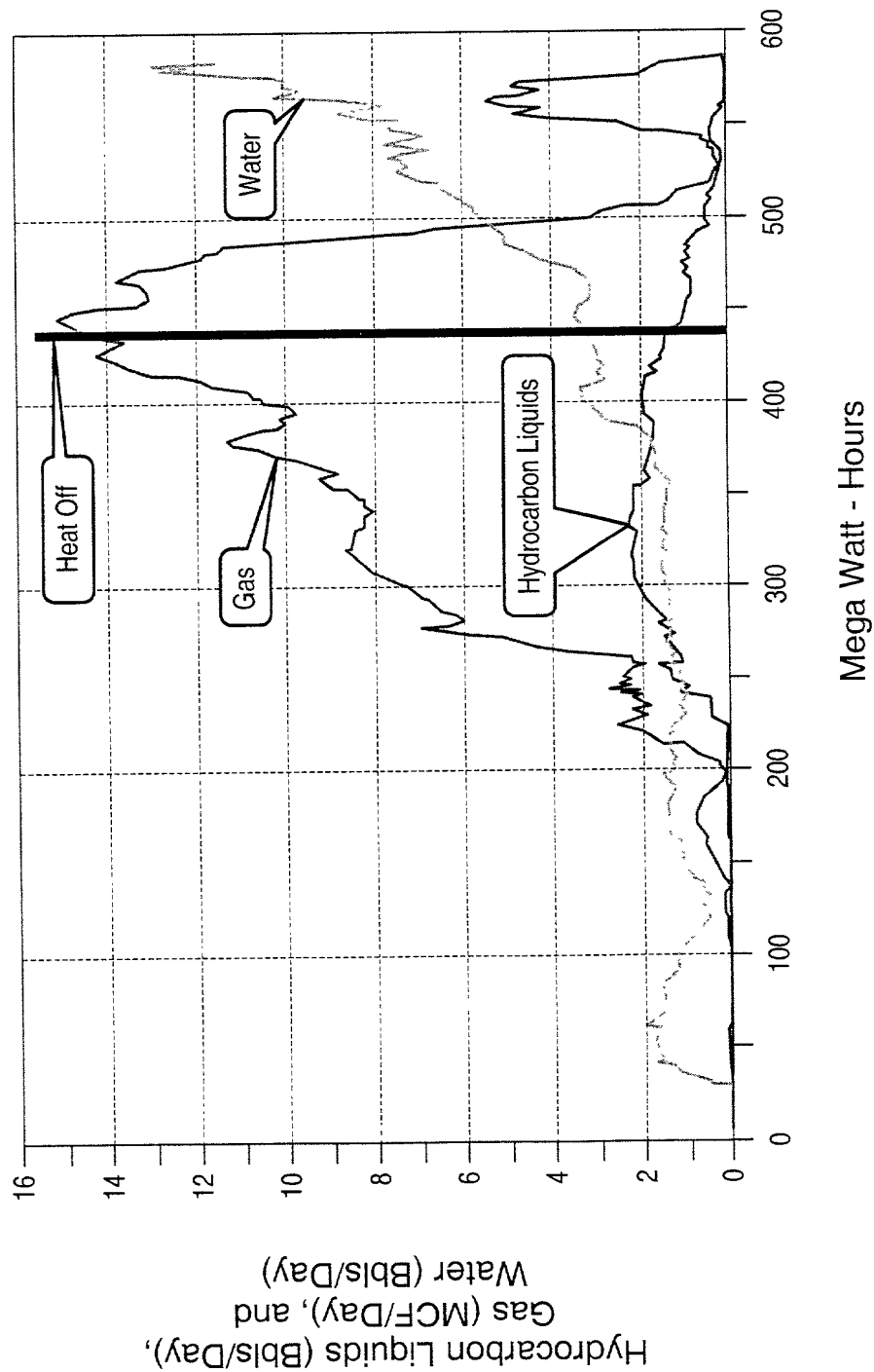
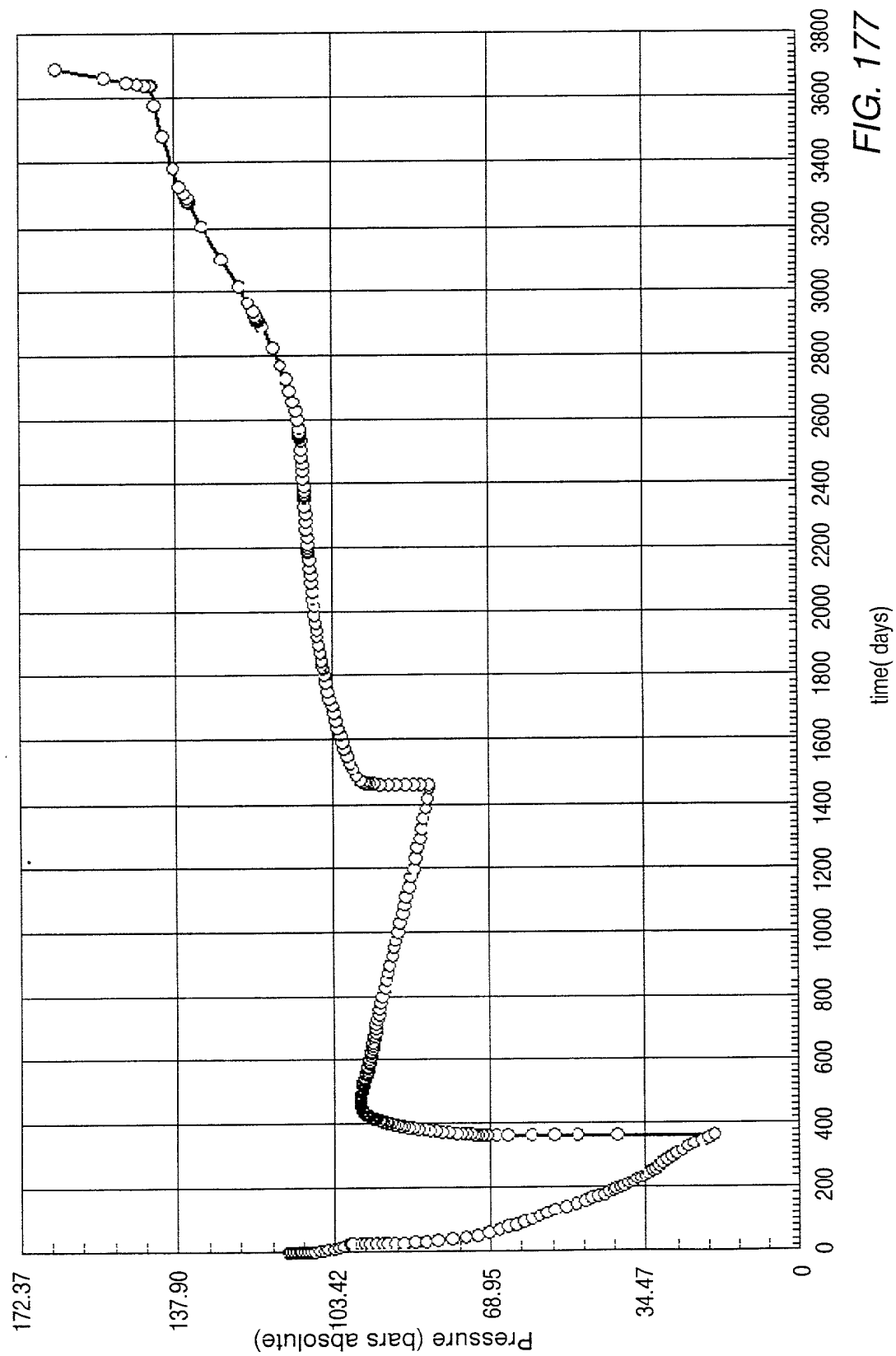


FIG. 176



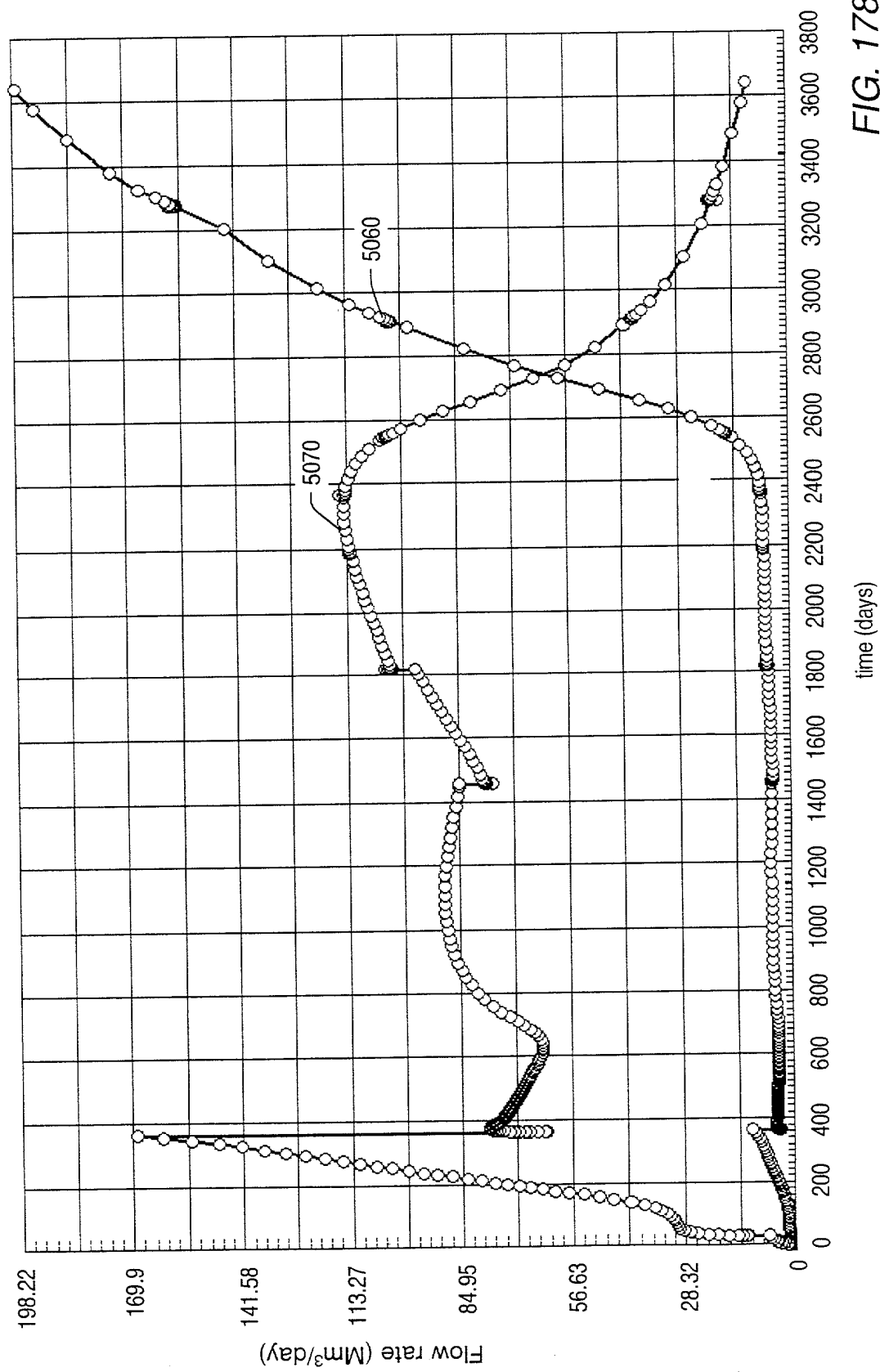
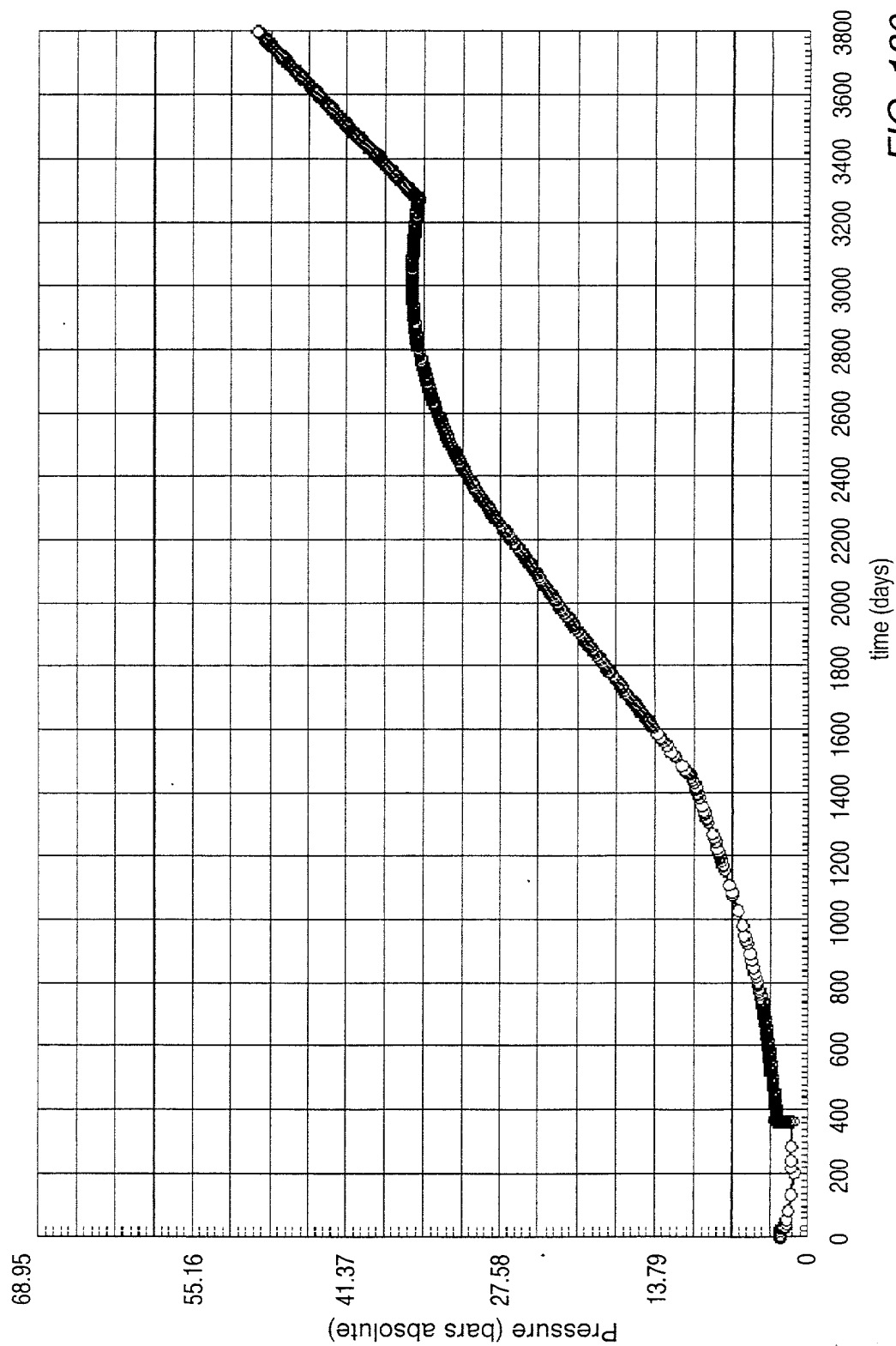


Figure 179 is a line graph showing the relationship between Bm^3 (Y-axis) and time (days) (X-axis). The Y-axis ranges from 0.00 to .708 with major ticks every .142. The X-axis ranges from 0 to 4500 with major ticks every 500 days. Two curves are plotted: one labeled '5080' and another labeled '5090'. Both curves start at (0,0) and increase. The '5080' curve is steeper and reaches a value of .566 at approximately 3500 days. The '5090' curve is less steep and reaches a value of .283 at approximately 3500 days. Both curves show a slight change in slope around 3500 days.

FIG. 179



Flow rate (Mm³/day) vs. time (days)

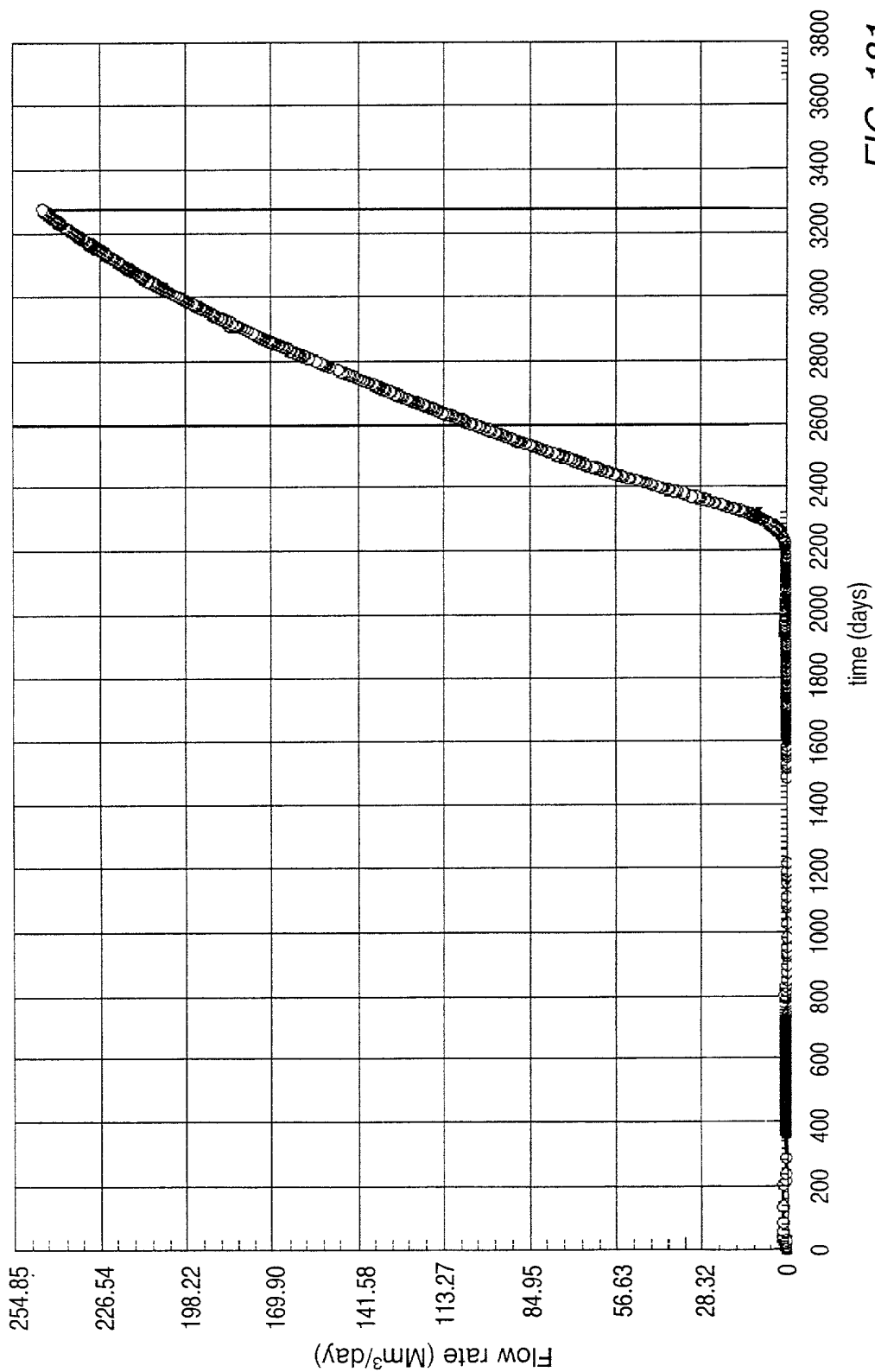


FIG. 181

0 500 1000 1500 2000 2500 3000 3500 4000 4500
time (days)

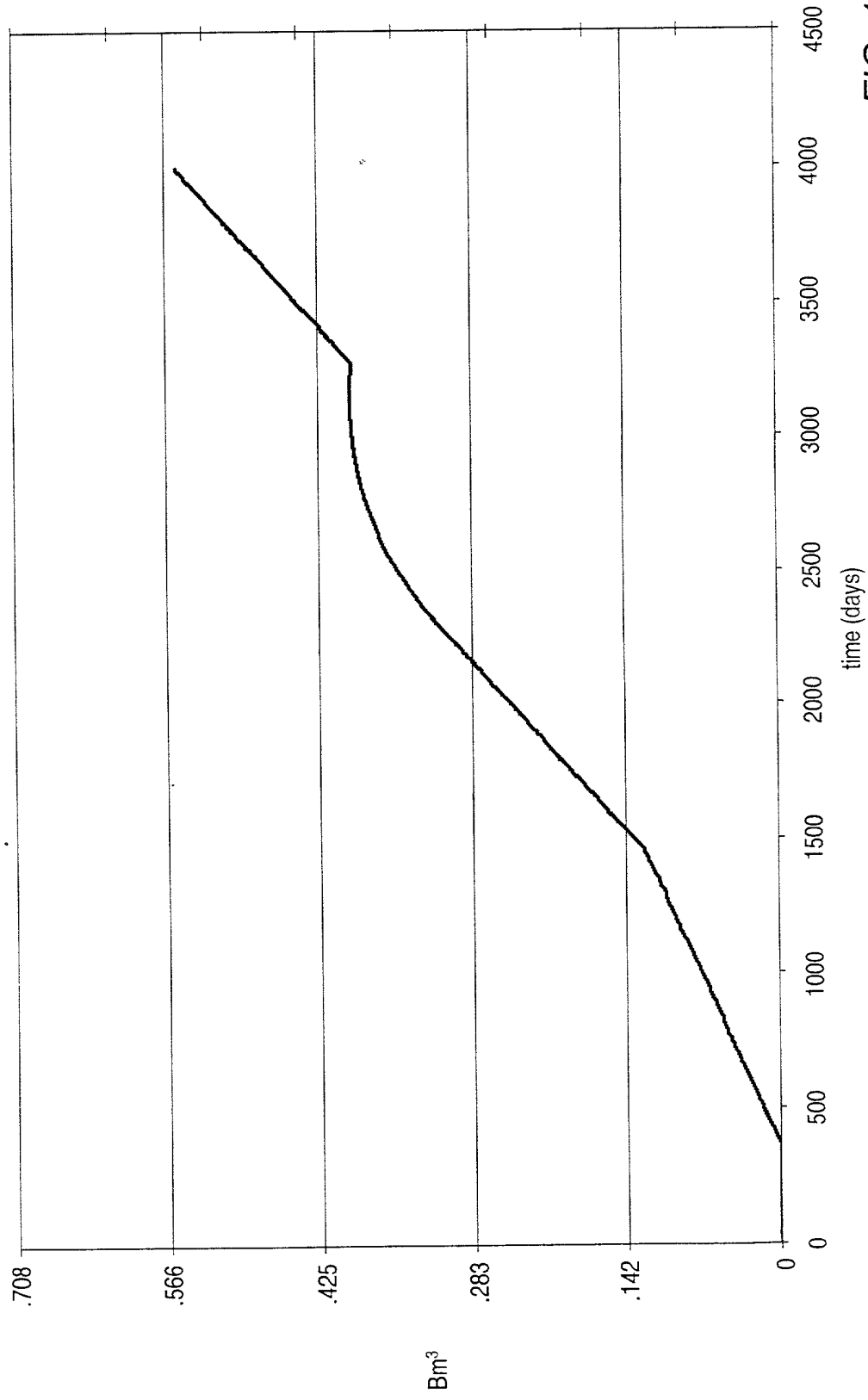


FIG. 182